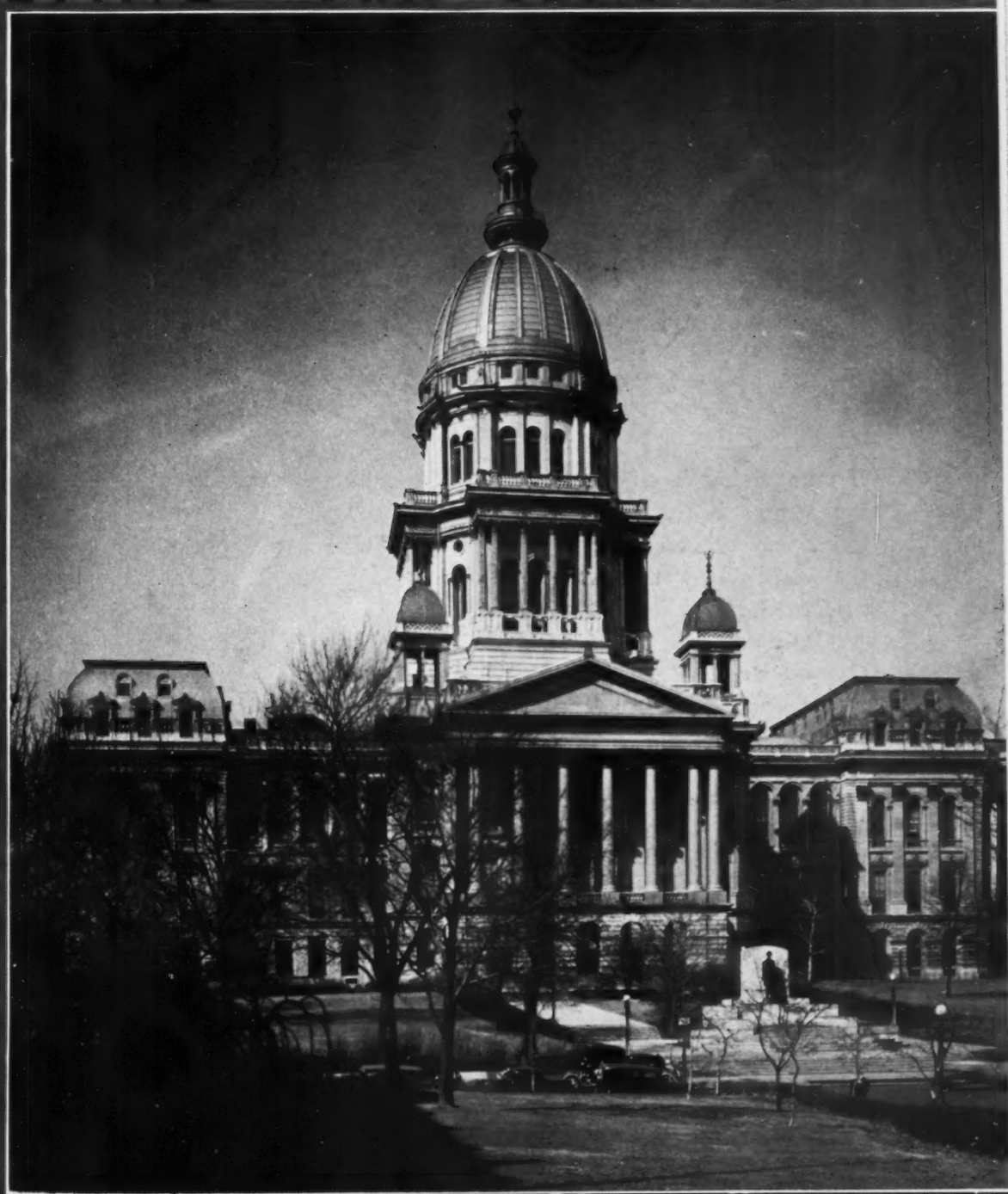
AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



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1934

ENDURO

REPUBLIC'S PERFECTED STAINLESS AND HEAT-RESISTING STEELS

at the other end of the wire

Licensed under Chemical Foundation Patents Nos. 1316817 and 1339378.

If your product is sold by its beauty—if it must resist heat—if it must weather the elements—if it must withstand certain chemicals or acid fruit or meat juices—there isn't any reason in the world why you shouldn't investigate the possibilities of ENDURO, Republic's Perfected Stainless Steel.

Gruen uses it for a tiny watch that is a masterpiece of beauty. Carrollton and Vollrath use it for kitchen ware that housewives can't resist. Dozens of manufacturers of dairy equipment swear by it. And the latest high-speed train by Budd is the crowning achievement of stainless steel.

One of the reasons why ENDURO is meeting a broadening demand is because of its wide distribution. If you are interested in knowing more about this lustrous, silvery metal that does not rust, stain or corrode under most conditions of service, just telephone the nearest distributor listed in the column at the right. Or if you want to try ENDURO—to see how easily it can be fabricated—the distributor will supply your needs from his stock. ENDURO is easy to obtain at the other end of the wire.

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The J. M. & L. A. Osborn Co.
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Central Steel & Wire Co.
Chicago Steel Service Co.
CINCINNATI, OHIO
The Mitchell Steel Co.
CLEVELAND, OHIO
The Hamilton Steel Co.
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The Prince & Izant Co.
COLUMBUS, OHIO
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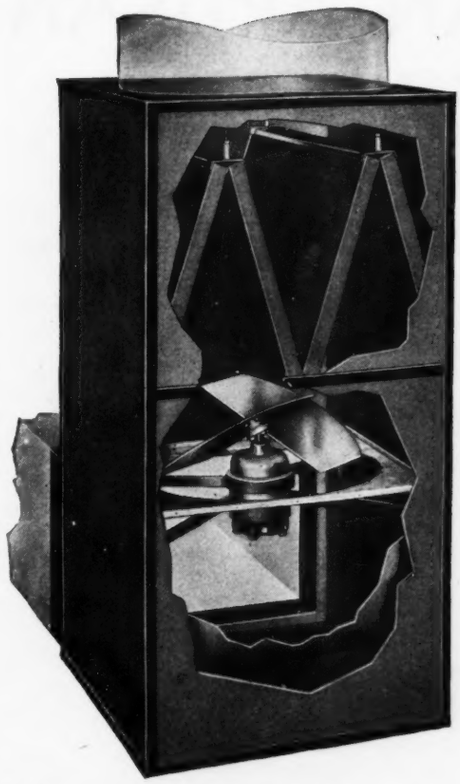

Hold-Heet Air Conditioner

Complete with all controls and equipment as described below. **$112.50** *Factory List Price*

Write for Substantial Dealer Discounts

AUTOMATIC CONTROLS
consisting of line voltage bonnet switch and adjustable speed control box.

"100-SPEED" BALLENTINE MOTOR
adjustable motor speed control permits *any* speed (output) needed. Hairline tuning for eliminating vibrations. Patented Ballentine Motor starts without dimming lights, goes on and off unnoticed—is the greatest motor development in recent years.

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Patented silent fan operates at frequency below audibility. Open design and direct air passage permits free gravity circulation.

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Filters give 2 years service on average job. Filters are "throw away," steel framed, non-sagging type. 2400 sq. in. (twice usual area).

FLOATING POWER
Air thrust balances rotor weight. Literally floats in air.

SUBSTANTIAL CABINET
Welded steel cabinet 28"x30"x58". Maximum capacity with minimum floor space.

One Universal Model for all types of furnaces . . . comes completely assembled—ready to hook-up . . . Fully Automatic . . . complete in itself, yet an interlocking unit in the HOLD-HEET UNIT PLAN of Complete Winter Air Conditioning and Summer Cooling.

The Last Word!

Silent Fan "100-speed" Motor 2-year Filters 1,000 to 2,500 c.f.m. One Standardized Production Unit for all types of furnaces

HERE at last is the practicable Air Conditioner for every home—a standardized production unit as staple as a furnace, a refrigerator, or automobile. It comes completely assembled in a steel cabinet, ready to hook-up to the cold air return. It eliminates all "engineering," all special accessories and controls, fits all makes and models of furnaces, has ample capacity for 95% of all homes. Will deliver *any* quantity of air from 1,000 to 2,500 c. f. m. Just turn the speed control handle in the control box to the exact output wanted.

The fan is noiseless. Adjustable speed control permits tuning-out of duct vibration. Patented Ballentine Capacitor Motor starts and stops without dimming lights. Fully automatic in operation. *The very last word* in every detail—the finest conditioner built, yet sold at a price most any home owner can afford.

Hold-Heet Recommends Over-Filtering

The HOLD-HEET conditioner has twice the filter capacity commonly used (comes equipped with 4 20"x30" HOLD-HEET Filters). This double capacity cuts velocity through filters in half "standard rating" basis of 300 c. f. m. reduced to 150 c. f. m. cuts power consumption to one-fourth, reduces circuit resistance 74% and greatly increases gravity circulation. Filter replacement cost remains the same for double area gives double life. HOLD-HEET Filters have superior covering that retains its adhesive quality, and ability to catch dust. Though of "throw-away" type, these filters last 2 years on average job.

This is Unit No. 3 of the

HOLD-HEET UNIT PLAN

Of Complete Winter Air Conditioning and Summer Cooling.
Factory List Price..... $112.50

All units are complete in themselves, yet are so co-related that they operate together without duplication or waste of parts. They bring a new day for the heating man and the home owner—make Air Conditioning practicable for everyone. The other units of the HOLD-HEET UNIT PLAN are:

Unit No. 1 THE HOLD-HEET SYSTEM (Heat Regulator for Furnaces or Boilers). Factory List Price..... **$29.50**

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Unit No. 4 HOLD-HEET SUMMER COOLING (Giant Nite-Fan for attic installation. Cools entire house)..... **$132.00**

Write ***Today for complete new information, data, installation diagrams, etc. on the full line.***

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Manufacturers

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Covering All Activities
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Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
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AMERICAN ARTISAN

With which is merged

FURNACES & SHEET METALS AND Warm-Air Heating

Vol. 103, No. 6 June, 1934 Founded 1880

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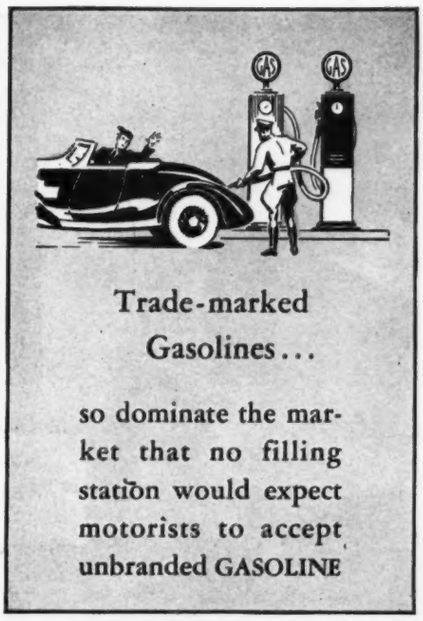

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so dominate the market that no filling station would expect motorists to accept unbranded GASOLINE

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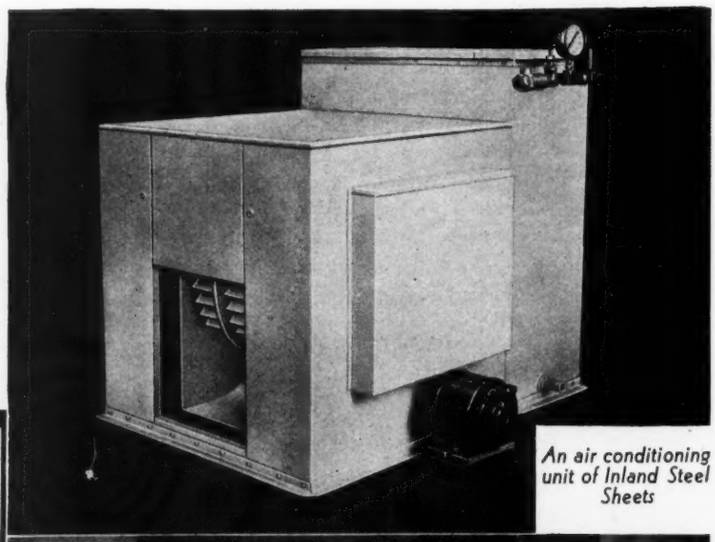

An air conditioning unit of Inland Steel Sheets

Part of 1500 tons of Inland Steel Sheets in new Chicago Post Office

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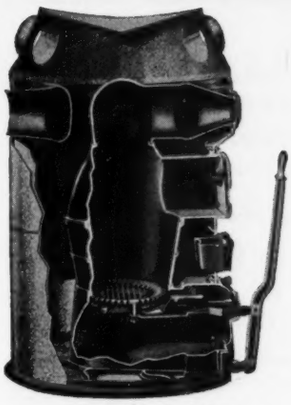
ABLE SERVANT OF THE CENTRAL WEST

Sheets Strip Tin Plate Plates Structurals Piling

Rails Track Accessories Bars Rivets Billets

See the Sunbeam Exhibit at the 1934 Century of Progress at Chicago

THERE IS A SUNBEAM JOBBER HANDY TO YOU



Interior View of the Sunbeam Cast Furnace

The dots on the map indicate the cities in which Sunbeam Jobbers are located. Practically all of these jobbers, except those located in the southernmost sections of the country, maintain complete stocks of Sunbeam Furnaces. The Sunbeam Jobber makes it possible for heating contractors to give prompt installation service without having their capital tied up in a large stock of heating plants many of which are slow-moving sizes.

You want to make your heating installations immediately when the sale is closed for good business reasons. Before the purchaser changes his mind or cancels the order. So you can get your money more quickly. So you can have the job finished and be ready to give immediate service on your next sale.

As far as the furnace is concerned, you can give this immediate installation service, if it is a Sunbeam! A phone call or telegram to the nearby Sunbeam Jobber, and your furnace will be on its way in a few hours. Or if convenient drive your truck to the jobbers warehouse and take the Sunbeam away with you.

Use the coupon to request information on the complete line of Sunbeam Furnaces and Air Conditioning Units.

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Address .....

City and State.....

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TO SAVE YOU TIME AND BOTHER

THINK of the time and bother these combinations will save you. They end the nuisance of "getting together" all the different parts. For in one box you have everything you need to do a first class job quickly and easily.

Each set consists of: A Hyro UNXLD Damper Quadrant or a Hyro Dial Damper Regulator together with the necessary Hyro Damper Bearings . . . . the proper size Parker-Kalon Hardened Self-tapping Sheet Metal Screws for fastening the Quadrant or Regulator to the duct and the rivets required for fastening the Bearings to the Damper.

This new method of packing is another good reason for using these famous Hyro devices . . . the UNXLD Damper Quadrant is considered the standard and best damper control by leading architects, heating and ventilating engineers and sheet metal workers. And the Hyro Dial Damper Regulator is universally favored for use where an inexpensive but thoroughly dependable Regulator is needed.

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OBTAINABLE IN THE FOLLOWING SIZES:

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For round and rectangular dampers to 20"

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Set No. 14—1/4" Hyro Dial Damper Regulator
For round and rectangular dampers to 10"

Set No. 19—3/8" Hyro Dial Damper Regulator
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190 Varick Street New York, N. Y.

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New Exclusive Processes end Costly Complaints

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And Granite City Tin Plate is cleaned by a special process used only by this company. Its extra clean surface makes soldering surer—lithographing clearer and brighter.

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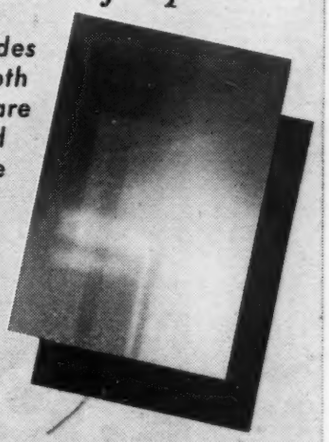
—Sheets Can't Be Out of Square—

Both sides and both edges are sheared at same time



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To give surer soldering, brighter lithographing

USE THIS COUPON

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Please send sample of Granite City Tin Plate.
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*Name*_____

*Address*_____

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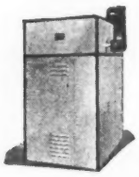
The S-N Line is Complete



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A highly efficient warm air furnace especially designed for oil or gas fuels. Ideal for use with the new S-N "Junior" Oil Burner.

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with these unequalled PROFIT-MAKING FEATURES ~

IN THE HEATING FIELD

1 Retail Price — $170.00

(Plus small installation cost). The price opens an enormous market — everybody a prospect. And price includes liberal discount to dealers.

2 Oil Heat at the Cost of Cheap Coal

Burns the heavier oils (as well as Nos. 1, 2 and 3) efficiently. Even crankcase drainings can be used.

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No oil burner experts needed. The purchaser can install if he desires. Fits any type of furnace.

4 No Servicing Needed

You can sell this burner and forget it. No delicate parts to get out of order or to keep adjusted. A practically trouble-free burner. (Nozzle has 110 times the area of pressure nozzles of same capacity.)

Write Today for Full Particulars

A Thoroughly-Tested Burner

L. L. SCOTT

Before offering the S-N "Junior" generally, some 400 to 500 burners were quietly put out and have been in service for three years—with practically no service.

Like all other units in the S-N line, the S-N "Junior" is the product of Scott and Newcomb, who during the past 16 years have created practically every important patent in the oil burner industry.

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1933-F PINE STREET

VOLUME 103 **AMERICAN ARTISAN** NUMBER 6

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING

Code Procedure

Dozens of letters have been received since the announcement appeared in our May issue that the code had been signed and placed in effect asking for information on the proper steps to be taken to set up the necessary agencies to make the code workable.

In answer we have said that general methods of procedure have been laid down by the NRA officials, the National Code Authority Committee, the National Association and various other bodies, but that so far no definite regulations or suggestions have been developed for the small or remote or isolated individual or organization removed from the influence of some centralizing body such as an aggressive state association.

At this writing much the same situation still exists. Our particular section of the construction industry has, in the words of one NRA man, "proved the most difficult division to define and regiment." This statement was made in all seriousness. It was based on the fact that our division has many ramifications, many activities, many interests. In some parts of the country each branch seems to have its individual firms while in other sections one firm may do all or more of the activities assigned to our division.

It is our suggestion, therefore, that where there is no central body to turn to the small association should proceed to set up its own Code Committee, assign to itself the logical territory it should control, establish its methods of compliance and regulation and send word to our divisional code Assistant Deputy Administrator—James D. Dusenberry. If the procedure has been correctly handled he will say so. If not, his suggestions will put you on the right track.

For the assistance of individuals and organizations not entirely familiar with the code and its workings we publish in this issue the code as approved and signed. Also Bulletin Number 1 which sets out the things which must be done—who to elect and how to elect them, how to register, how to set up administration expenses.

It is suggested that this bulletin be read carefully. It is the only authoritative information we have to go by at present.

We will be glad to answer questions. If we can't answer them we can refer them or you to someone who can.

Better Business

So much attention has been given lately to codes and code work that we sometimes wonder if the contractor has forgotten all about his own business. Probably this is idle speculation for it usually isn't human nature to forget the daily bread and butter over something less close to home.

And in spite of some timidity on our part, due to our dislike of being thought preachy, we offer here the suggestion that those who have been close to the grindstone ought to raise up for a minute and look around.

Contractors are actually selling jobs. Furnace jobs, forced air jobs, gutter and roofing and general sheet metal repairs, cooling installations, automatic heating equipment, repair of existing or unused blow piping, ventilation, collecting systems; even here and there some contractor is getting one of those long sought after new architectural sheet metal projects. Industry does seem to have been on the upgrade these past few months and numerous idle plants have enlarged their forces and started long idle machinery.

More interesting—new ideas and plans are in the wind. It has been a long time since men had the courage to even think about plans dropped in the years of the depression. Right here in our own back yard we hear with increasing frequency of work let to contract which has been on some architect's drafting board for months or years; or of work which other new ideas have generated. To cite a specific instance, liquor has filled up many an idle store building or long vacant floor space. These places need good air in direct proportion to their swankiness. And good air in such establishments means ventilation, cooling, cleaning, etc.

We honestly believe that this summer will be a critical one in air conditioning. Of course firms and individuals will not have the money to buy all they want, but as we see it this summer will tell whether air conditioning is only a passing fancy or an honest-to-goodness demand.

So let all those who have been nose to the grindstone stop for a minute and take a survey of their field. Perhaps you've overlooked some work which needs to be done and which can be paid for. Competition will be keen and prices may be ruinous, but more people want good things now than two years ago. There's hope for the contracting business.

The Springfield, Ill., Capitol—Outstanding Zinc Job of the Last Five Years

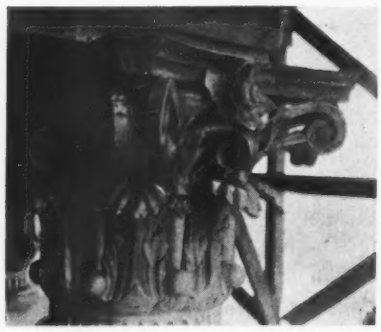
By William Vree

Superintendent, John W. Thompson Co.

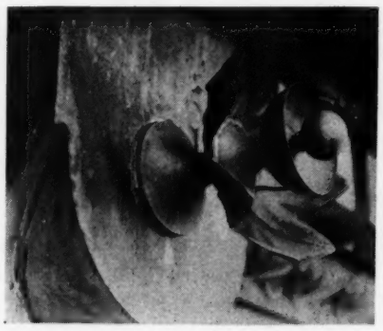
THE IMPRESSION, on approaching the State Capitol Building in Springfield, Illinois, is that of its immense size. The towering height of its dome, together with the beautifully ornamented lantern terminating in ball and flagpole, creates a feeling as if the Capitol were trying to reach the clouds with the tip of its finger. This impression of "largeness" is greatly increased when facing the ornamental sheet metal work from nearby. To look at these large cornice members is inspiring considering that the new work had to be erected 200 to 300 feet up in the air.

I understand that the original work was erected in zinc in 1888, and was attached to wood sheathing underneath. Looking at Fig. 2 you will see that the work on this building has four distinct parts: First—the cornice work with its columns, caps, and balustrade on the porches at the lower level. Second—the lower circular cornice work and window pilasters just below the dome. Third—the dome proper. And last—the ornamental lantern with ball at the peak which is about 350 feet above the street. The two last parts were renewed with copper in 1906.

The old work was in terrible condition; flattened out, torn away; cracks and big gaps were of frequent occurrence. When we examined the metal work we found both the copper and the zinc work to be in good condition, but closer investigation revealed that the wood sheathing underneath had given away, caused by dry rot, broken struts, etc. As a result of this, the cornice work had lost its support and started to hang down flat alongside the walls. In several places the metal had broken away, leaving large holes. The result was that



The pre-stamped capitals were made in two parts, assembled in place on the columns by riveting the inner shells around the stone and then soldering on loose ornaments.



Another stamped ornament—these flowers form a row on the frieze beneath the main cornice. The photograph shows the construction and points of soldering.

the whole dome began to leak like a sieve, causing considerable damage to the interior.

Having learned the true cause for the crumbling away of the metal work, the new work was designed with the view of avoiding a similar occurrence. Under the direction of Mr. Herrick C. Hammond, State Architect, his department specified that all metal work and underlying sheathing should be removed, the remaining steel trusses and beams scraped, repaired and painted, and then designed new metal work to be reinforced with ¼ by 2-inch braces to be attached to the steel supports.

The first thing to be decided was whether the work should be erected in zinc or copper. In view of the fact that zinc is a home state product, the decision was made to use No. 14 gauge sheet zinc of a special mixture having a part of copper and even some silver.

Now zinc has many peculiarities. When it is warm in summer it becomes soft and goes out of shape easily. When cold it becomes brittle and cannot be bent without breaking unless preheated. Then the contraction and expansion of zinc is nearly three times as much as that of iron, the coefficient being 0.000016, which required an innumerable amount of expansion joints, both vertical and horizontal. And, finally, all vertical surfaces will sag and stretch during the summer months and never go back to their original position, compelling all horizontal lock seams to be at least 2½ inches wide. With these difficulties in mind, the John W. Thomson Co., Chicago, started the layout work and decided to fabricate all zinc work with the necessary reinforcing bars at their plant in Chicago, and have the ornamentations stamped by Friedley & Voshardt Co., also of Chicago, then after the material was shipped, to build a shop at the site in Springfield and there do all the assembling work.

Several truckloads were shipped, the total amount of zinc being around 75,000 pounds; reinforcing bars, 30,000 pounds; solder, 5,000 pounds, together with bolts, cleats, and all necessary tools.

A time schedule was made up requesting us to erect the work on top, starting on July 15, and finishing the job before the month of December. However, we met with a serious delay caused partly by the extra repair work which had to be done on the existing steel and partly by the late arrival of the new steel and concrete slabs. The result was that the job ran three and a half months behind schedule and we could not start the installation of our work before November 1.

This setback caused us serious difficulty as we were thrown into a winter job and all the zinc had to be preheated before it could be worked, a performance which cost us a lot of extra time and money.

Let us now consider the detailed

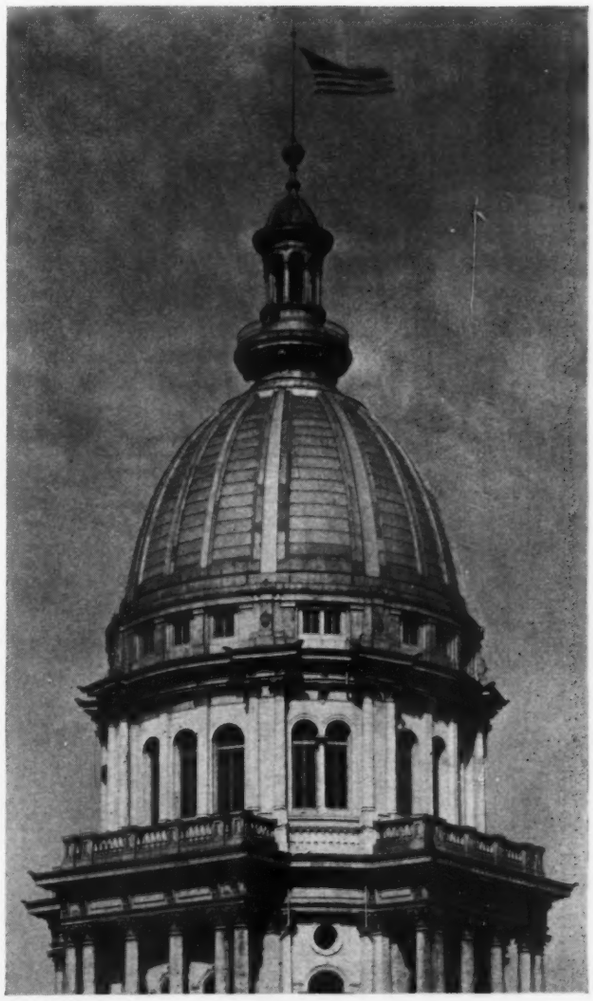


Fig. 2—At the right is a closeup of the upper section of the huge dome where the zinc was applied. In order from bottom to top are —the main cornice with capitals and balustrade; second, lower dome cornice with window pilasters; third, the dome proper; fourth, the ornamental lantern and finial.

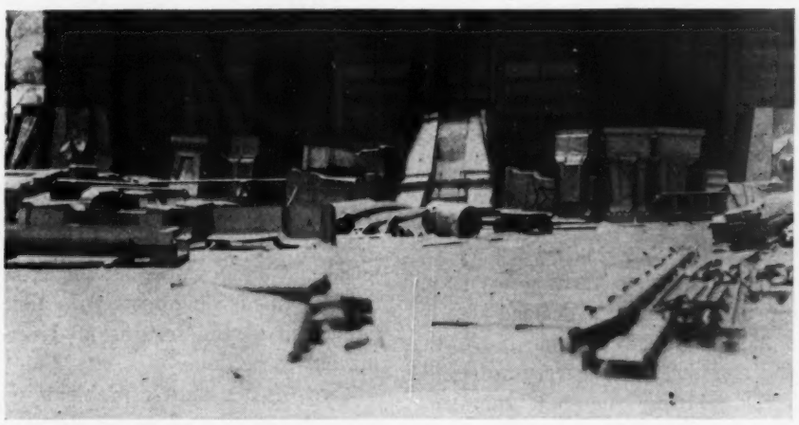
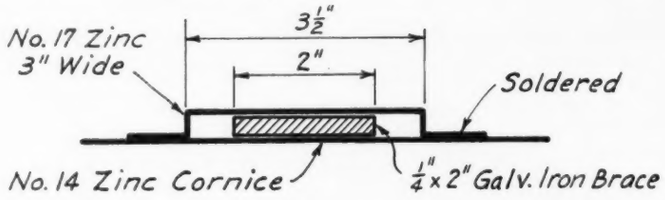


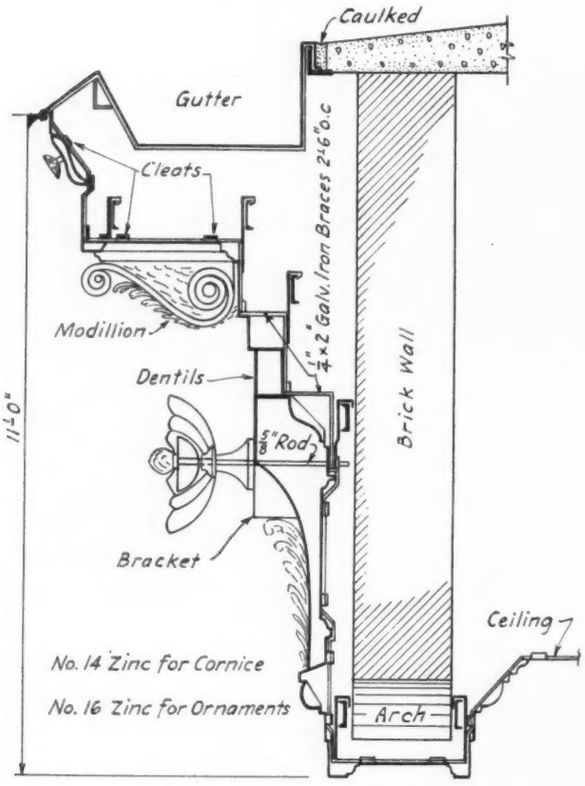
Fig. 1—Below a view of the yard showing large sections stored for winter assembly to be taken later into the heating house and heated so the zinc would not crack when assembled.

construction. Refer to Fig. 1. You will notice some of the pilaster work stacked up against the State House with ¼ by 2-inch reinforcing bars fastened to the back of the zinc. These were fastened not with the usual bolts and nuts, but with cleats 3 inches wide, giving the bars ¾ of an inch allowance on each side for expansion and contraction. (See sketch 3.) This construction was made typical for all cornice work throughout the whole job upon request of the architect.



SKETCH NO. 3 SECTION A THRU CLEAT

This was rather superfluous inasmuch as we had the bars made in such a way that they would hook over the steel and, therefore, had all the allowance one could wish for. (See sketch number 4.) There you will notice the hangers welded onto the ¼ by 2 inch braces and hooked over the channel and angle irons. They were not bolted onto the steel work as shown on the architect's drawings, but left loose to allow free movement, which made the cleat construction unnecessary.

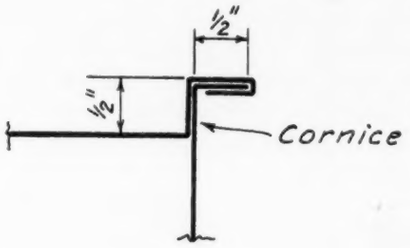


SKETCH NO. 4 SECTION THRU CORNICE AT PORCHES

Furthermore, cleats as constructed for this job have a decided disadvantage. They were made of No. 17 zinc and will become very soft and pliable during the hot summers which usually occur in Springfield. The weight and strain of the cornice will cause the back of the cleats to bulge out, and allow the cornice to come away from the braces more and more each year, leaving in the end an inferior job. What is the reaction of readers on this matter? Don't you think that braces fastened to the cornice work with bolts and washers would have made a better job?

On this page are various details of the job with explanatory captions. Reference is made in the text on this page.

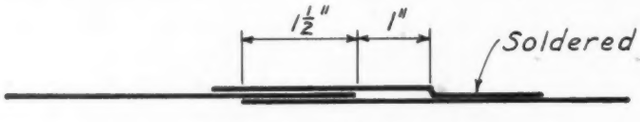
Sketch number 5 shows the expansion joint which was used on the vertical seams of all cornice work. It is the old-time joint except that more allowance was given, due to the great expansion and contraction of zinc (about ¼ inch per 10 linear foot at a variation of 140 degrees Fahrenheit).



SKETCH NO. 6 SECTION B THRU LONGITUDINAL SEAM IN CORNICE

The longitudinal seam shown on sketch number 6 has been used throughout. I can certainly recommend this seam for a good, substantial job. It takes a little more material and brake work, but the extra cost for this is far offset by the time gained in assembling, as no riveting has to be done.

Two of the biggest problems on this job was the allowance for expansion and contraction and the peculiar feature of zinc that when it hangs down as do the roof sheets in plate number 7, it will stretch and sag in hot weather, but never come back to its original position when it gets colder. Having in mind that this will be repeated every year, a seam was devised as shown on sketch number 8. The allowance given for sagging is 2½ inches. The sheets were held in place by No. 17



SKETCH NO. 5 VERTICAL EXPANSION JOINT IN CORNICE

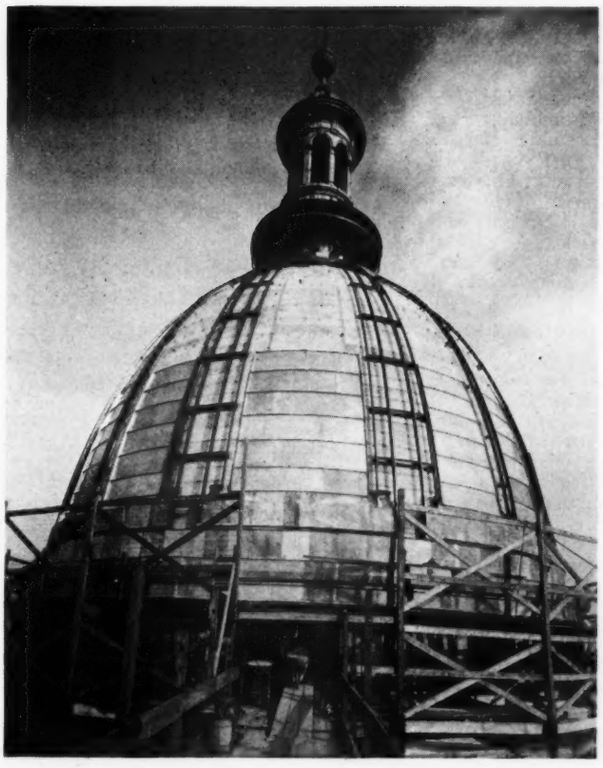
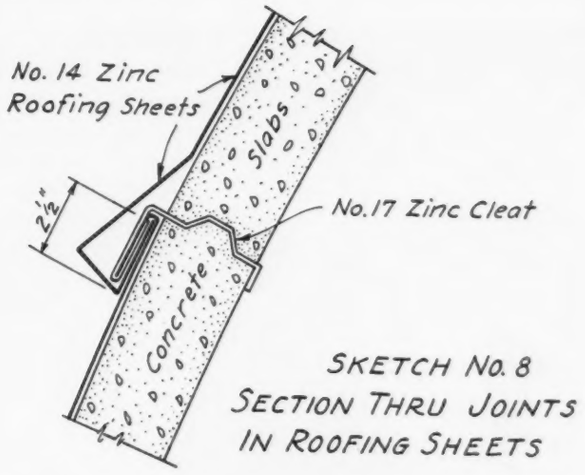


Plate 7—Above construction view of the dome in winter showing main rib and application of pan sheets.

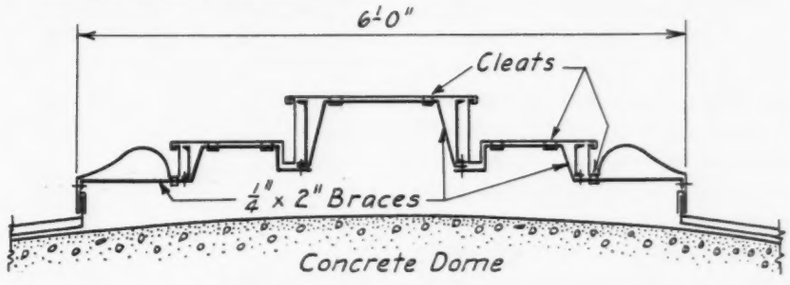
zinc cleats embedded in the seams of the concrete slabs. Care was taken that the sheets were made the same width as two concrete slabs in order to have the seam of the sheets meet the cleats in the concrete joints. (See plate number 7.)

You will notice that while the middle of the sheet comes up to the cleats, the ends are hanging down about 2 inches. This is due to the curvature of the dome, while the sheets were made in straight lengths. However, we made the cleats of sufficient length to overcome this handicap. The edges of the sheets were turned up to fit into the groove made in the ribs as shown in sketch number 9. This gives the rib freedom to move independently of the sheets.

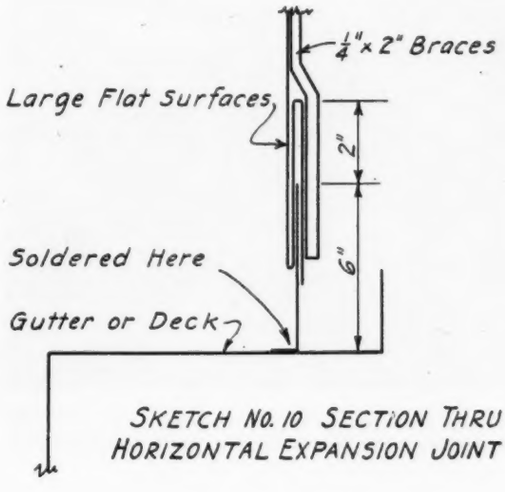


SKETCH No. 8
SECTION THRU JOINTS
IN ROOFING SHEETS

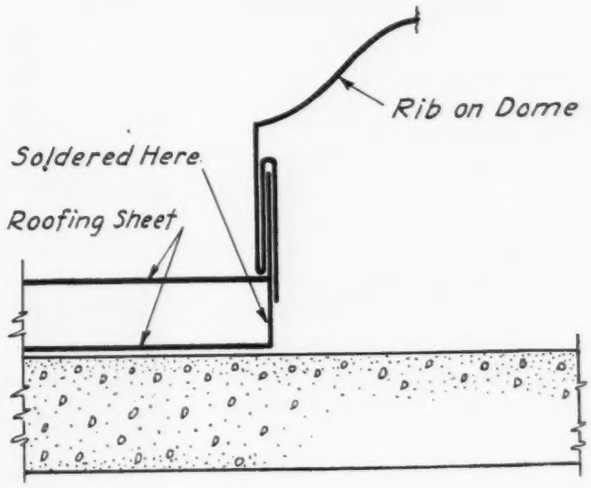
There were also several horizontal expansion joints made as shown on sketch number 10. They were installed around the whole contour of the building in all necessary places, especially where large flat surfaces terminated on top of decks and inlaid gutters. These surfaces did not rest on the decks, but had braces attached to them which were hanging over the steel work above, holding the zinc work 3 or 4 inches above the decks giving it plenty of allowance to sag.



SKETCH No. 11 SECTION THRU
LARGE RIB ON DOME



SKETCH No. 10 SECTION THRU
HORIZONTAL EXPANSION JOINT



SKETCH No. 9 JOINT BETWEEN
ROOFING SHEET AND DOME RIB.

Plate 13—Closeup of the ornamental lantern showing intricate fabrication and assembly of columns, capitals, cornice. This vast detail of metal work exactly duplicates original masonry and metal work.

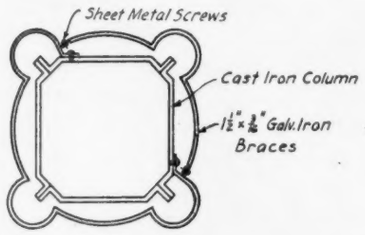
▲

At the right is a cross section of one of the lantern columns showing two piece fabrication and method of assembly. The photograph above shows the rivets used in assembly. Below is a cross section of the finial through the ball showing method of assembly.

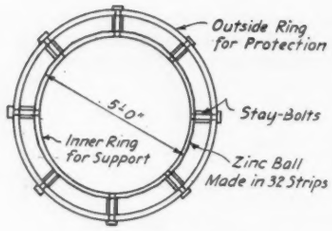
Sketch number 11 shows the construction of the main ribs on the dome. The ¼ by 2-inch braces had to be bolted onto the steel work first, then the zinc had to be fastened with cleats. In order to do that, zinc cleats which were open at one end were soldered at the place where the braces would occur; on the dome the zinc work was laid on a little higher than the braces and shoved down in place so that the cleats would slip over the braces. After that the lock seams were finished by hand and the lower part soldered onto the deck of the dome base.

New let us take a look at the last part — the lantern. The columns supporting the lantern were made of cast iron as shown on sketch number 12 and were already in place and only needed to be scraped and painted. The zinc covering was made in two parts reinforced with 3/16 by 1½-inch braces. The cast iron support was drilled and tapped to receive the braces of the first half, while the other half was put on with a slip joint and fastened with hardened screws. You can see them clearly on plate number 13.

Notice is called to the highly ornamented character of the work. The capitals at the top of the columns were made in halves and soldered in place, leaving the joint at the rope ornament open for expansion and contraction. A similar condition is shown on plate number 14 (showing a deck) where the large capitals occur. They were also made in halves, the inner shells being riveted together around the stone columns and the missing ornaments soldered on after the capitals were fastened in place. All the ornamental work such as the abacus, leaves, flowers, scrolls, etc., were stamped in parts by Friedley & Voshardt Co., while all this work was assembled and built upon an inner shell by the John W. Thomson Company.



SKETCH NO. 12 SECTION THRU COLUMN AT LANTERN



SKETCH NO. 16 SECTION THRU BALL

The ball at the top of the lantern is five feet in diameter and was made of 32 longitudinal strips. See sketch number 16. It has reinforcing bars resting on the inner ring for support, while the outer ring was fastened afterwards with stay-

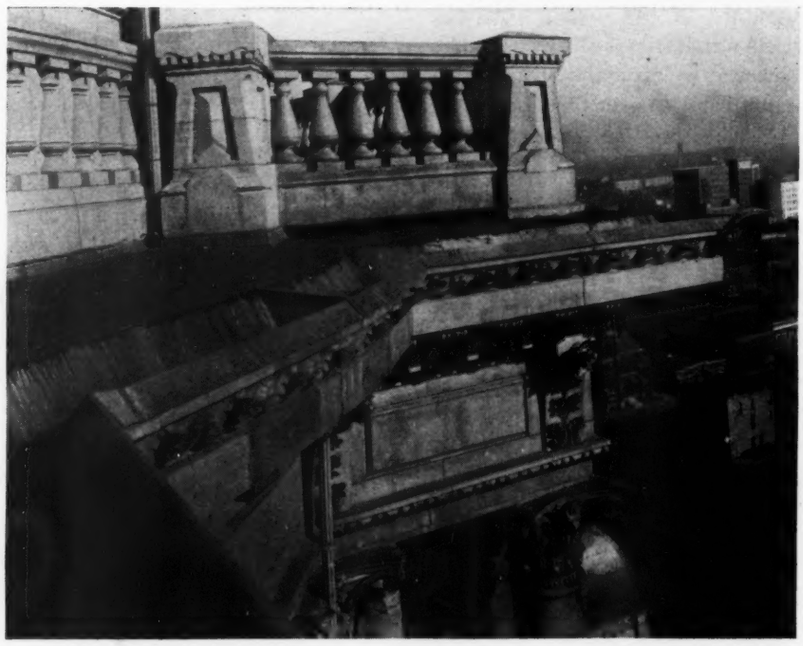


Plate 14—Closeup of main cornice showing metalled balustrade, gutter and frieze. The picture gives a good idea of the intricate work fabricated and hung.

bolts to protect the ball from the flagpole line. The finial at the top of the flagpole was put on by a steeplejack. The remarkable feature of the old finial was that it had six or seven large burned holes in it caused by lightning striking the Capitol Building. The steeplejack fastened the relic on top of his truck, paraded with it through the streets of Springfield exhibiting it like a trophy won in a hot fought battle. I heard he sold it later as a curiosity for $25.00.

Let me say a few words about the erection work. The original plan was to start from the top down, i.e., first the lantern, then the dome, after that the circular cornice and pilaster work around the base of the dome, and finally the porches with cornice, capitals and ceiling work. However, due to delay, this plan had to be changed later on.

Plate 18 — Construction view showing the material hoist, scaffolding used for the metal work and a partly completed dome roof.

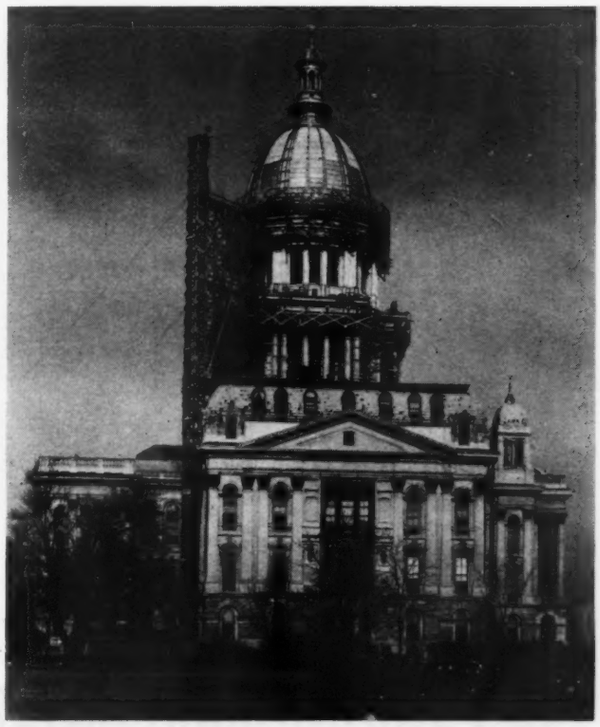


Plate 17—Winter view of construction yard showing material received from Chicago plant arranged and numbered for proper location on dome. Every piece of work had to be heated before it could be worked

We started with the porch cornice and ceiling. Right after that, the circular cornice and lantern almost at the same time. A little later the dome base with pilasters between and around the windows and finally the dome sheets with ribs and the balustrade on the porches.

As mentioned before, the assembling work was done at Springfield at the site of the Capitol grounds. A shop was built as shown on plate number 17 which was 20 feet in width, 40 feet in length, with a platform along the whole front 15 feet wide used to make a correct layout for the circular work.

The scaffolding was erected by the General Contractors, W. M. Allen Company of Peoria, Illinois. They also erected a hoist with a separate landing leading to each scaffold and alongside the hoist a boom set up at the highest landing, which plate number 18 shows faintly.

The cornice work was all assembled in 16 and 20-foot lengths complete with ornaments and braces. These sections were hoisted up by the boom and taken off at special built platforms at the top. The smaller work was taken up by the hoist. Many pieces had to be made in halves to fit around poles, columns, etc.

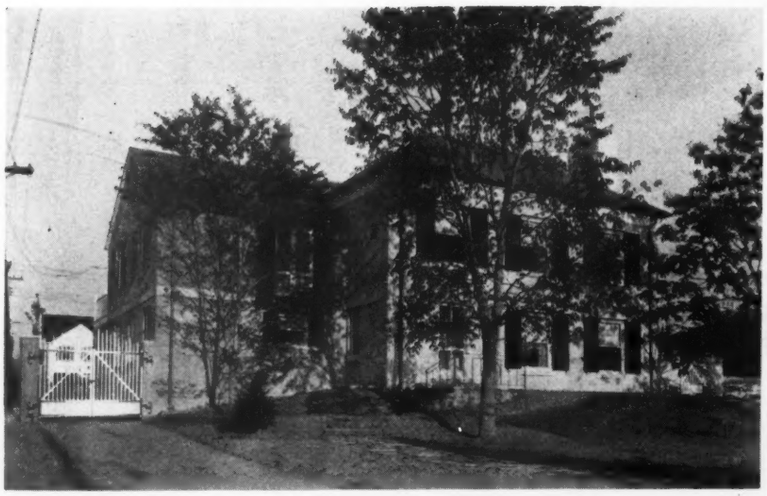
It took five months to erect the work from November 1 until the last part of March, which was very good time, considering the days which were lost on account of rain and snow, and the extra time spent for preheating and reshaping the mouldings. Besides myself, I had three men from Chicago as per agreement and the remaining thirty from Springfield. I must say that these boys were all good workers, willing to go along, several of them being very good mechanics. They should be recommended and given due credit inasmuch as this job was the most complicated piece of sheet metal work erected in the U. S. during the past ten years.

Besides mechanical ability, there were also signs of literary talent exhibited, in fact we may have developed a second John Bunyan as indicated in the following:

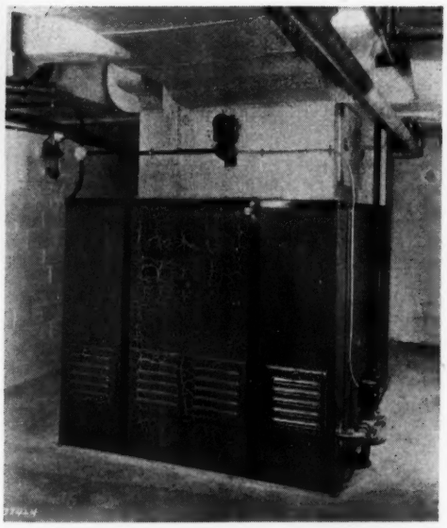
THE SHEET METAL WORKER'S PLEA

In Springfield's heat we toil with pain
To beautify this dome.
We give our strength, sometimes our blood
For the glory of State's home.
Our labor, hard, be not in vain
If God keep us from sin
He grant His blessings here—on top
And give His Spirit—within.

Before the halves of the ball were put together we inserted this poem with other interesting papers such as the newspapers of that date, a list of names of the men that worked on the job, etc., that posterity may find something of interest in our struggles and tribulations.



The exterior of the house and the heating plant with an abbreviated data sheet are shown on this page. On the next page are the basement and floor plans of this newly completed installation which shows present practices around Cleveland. Attention is called to the complete circulation, bath room venting, absence of dampers and other features.



A Cleveland Air Conditioning Installation

WHEN one doctor prescribes for another doctor, he is pretty likely to be extra careful in his diagnosis and prescription.

Likewise, when a heating contractor installs an air conditioning system for a man who occupies a commanding position in the heating and sheet metal business, the installation is likely to be above the ordinary, both in planning and workmanship.

Such indeed is the air conditioning system installed by Mannen & Roth, Cleveland air conditioning contractors, in the new home in Shaker Heights, a suburb of Cleveland, owned by J. T. Hagan, General Manager of Sales of The J. M. & L. A. Osborn Company. This home is one of the many fine air conditioning systems installed by Mannen & Roth in Cleveland and vicinity which are a real credit to the air conditioning industry.

The heating unit is a G-400 Moncrief Air Conditioning Gas Furnace, comprising eight burners of 30,000 B.t.u. input each. The casing is rectangular, finished in mottled gray, trimmed with black. Each burner is enclosed in its own separate heating drum, so baffled as to provide a travel of 10 feet from burner to exhaust manifold. Fins on the exterior of the drums increase the effective radiating surface in relation to B.t.u. input.

The main trunk line is designed for air velocities of between 600 and 700 f.p.m. Branch line velocities are approximately 400 f.p.m., and the velocity of warm air at the registers is between 250 and 300 f.p.m. Return air velocity is around 250 f.p.m. The velocities employed were worked out from experience and by the particular requirements of the installation.

ROOM	B.T.U. LOSS	C.F.M.	REGISTER FREE AREA—F.A.	RETURN FREE AREA—F.A.
Recreation	12145	149	70	150
Living	13369	164	120	150
Dining	14128	173	84	150
Breakfast	5683	70	50	50
Kitchen	6440	79	50	
Stair Hall	7263	89	90	125
Stair Hall up	8232	101		60
Rear Hall	3975	49		100
Lav. & Floor	5990	73	55	
Closet	3360	41	20	
Vestibule	8410	103		50
Bed #1	15878	194	124	125
Bed #2	10561	130	78	100
Bed #3	7540	92	57	90
Bed #4	12105	148	91	100
Bath #1	6185	87	47	3½x6 VENT.
Bath #2	3051	43	30	3½x6 VENT.
Bath #3	3421	49	32	3½x6 VENT.
FUTURE BED & BATH	24562	300	100	
TOTAL	172298	2134		

WHERE F.A. IS GREATER THAN REQUIREMENTS A LOWER VELOCITY AND SAFETY FACTOR WAS USED.

The duct work is rectangular throughout from casing to registers. Outside the furnace room everything is concealed, all of which contributes to a job presenting the finest appearance.

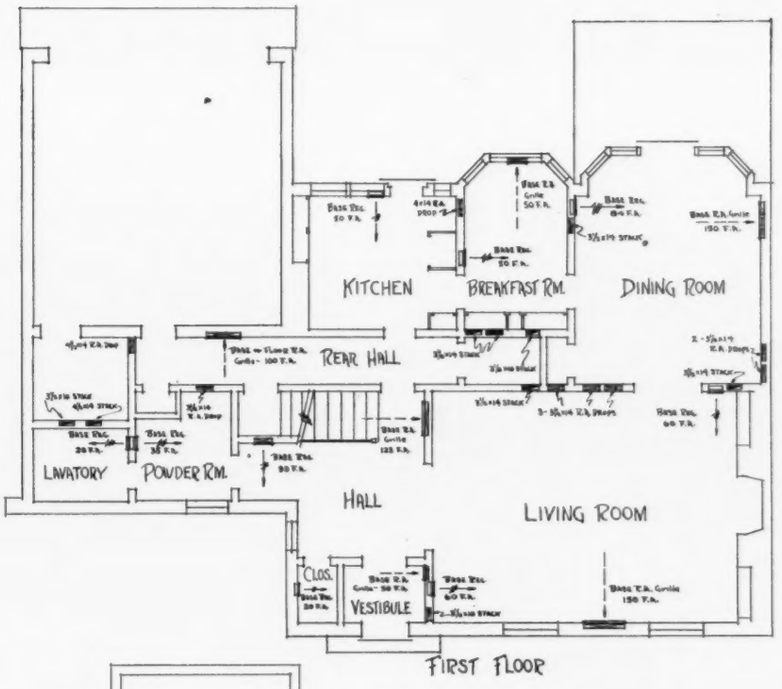
An interesting feature is the absence of all dampers in the ducts. This means that the engineer had to be sure of his figures and plan in order to eliminate dampers entirely. That the installation was well laid out and installed is proved by the fact that the air delivery has been perfect.

As shown on the plans the powder room, lavatory, and tool room are above an unexcavated part of the foundation, and here the duct work is double rectangular pipe, with 1½-inch mineral wool insulation.

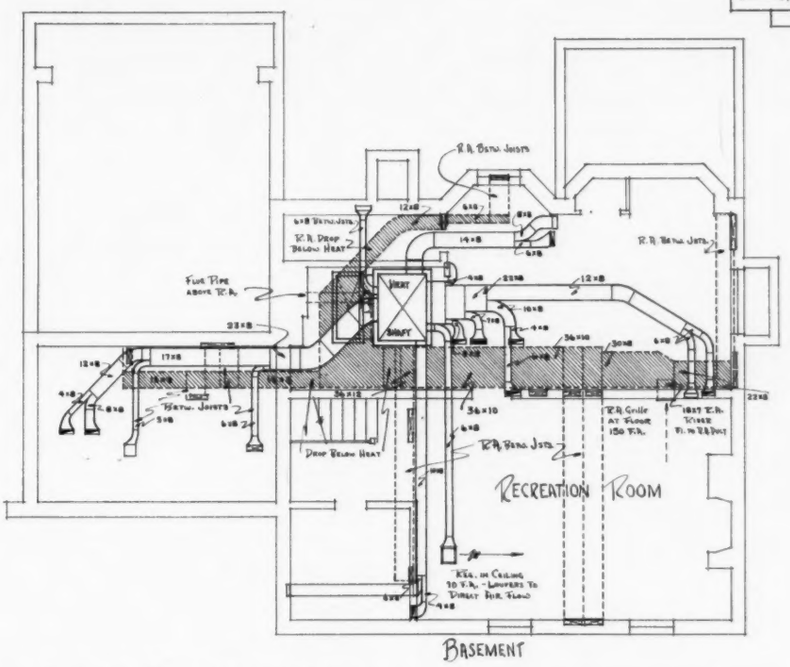
The question of insulating all the ducts in the basement was consid-

ered and rejected as it was considered desirable to allow enough heat to radiate to heat the basement to a low temperature.

All warm air and return air registers are located in the baseboards. The reason for this is that, in Cleveland territory at any rate, home owners want their air conditioning systems to bear as little resemblance as possible to an ordinary furnace job. The large number of registers, all located in baseboards, creates a distinctive appearance. There are, for instance, 13 return air registers in this installation, six each on the main and second floors, and one in the recreation room. All register faces were left in the priming coat



FIRST FLOOR



BASEMENT

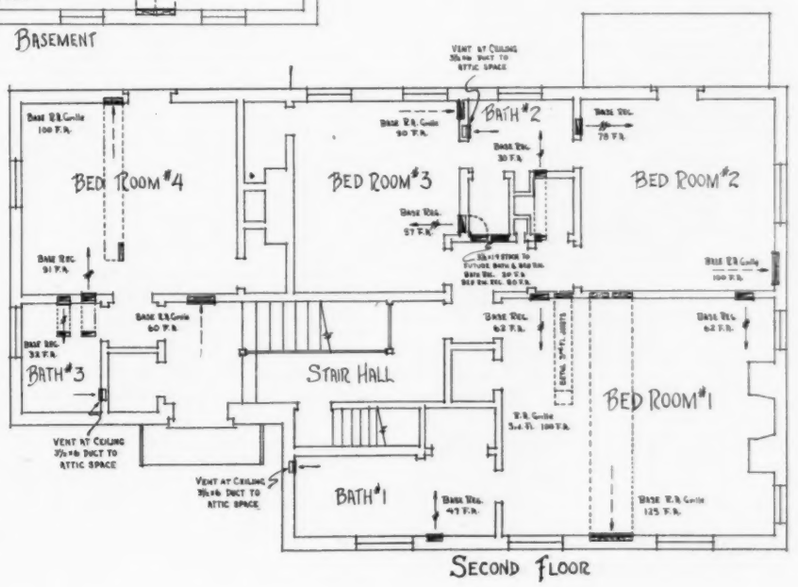
so that the dec or could later finish them to rm to the interior of each room.

There are a number of interesting points in the design of this system. For instance, the locating of a warm air register in the coat closet just off the vestibule. Also, in addition to the main warm air registers in the bath rooms, another register in each is connected with a stack opening into the attic. This register is placed in the baseboard and acts as an air release when the door is closed. It is fitted with a valve which may be closed to prevent back draft under certain conditions.

The selection and number of automatic controls governing the operation of the system were dictated by experience. The aim was to make the control system as simple as possible, and yet render every useful service. This installation employs a plain thermostat with electric motor valve for regulating temperature; a combination limit control and blower switch; and the burners are equipped with safety pilots.

Because of its dependability, the humidifier is of the evaporating pan

(*Continued on page* 54)



SECOND FLOOR

The Roofing and Sheet Metal Contracting Code

ARTICLE I

DEFINITIONS

Section 1.—This Division.† The term "Roofing and Sheet Metal Contracting Division," or "this Division," as used herein shall mean the contracting for and

(a) the installing, applying, repairing, re-roofing and servicing or maintenance, of roofs, on which sheet metal, slate, tile, asbestos or composition or membrane roofing, asbestos or other roll roofing, insulation and other special treatment of roof surfaces is required, and the furnishing of the materials therefor as a part of such contracting; the erecting, and applying, of sheet metal, slate, tile and asbestos used for siding on any building or structure, and the furnishing thereof as a part of such contracting;

(b) the re-roofing, servicing and maintenance of roofs on which asphalt shingles or asphalt roll roofings are required, and the furnishing of materials therefor in connection therewith, and the applying of asphalt materials used for siding on any building or structure, and the furnishing of materials in connection therewith;

(c) the supplying and laying of plastic subflooring such as asphalt, mastic asphalt, and tar concrete floors or sidewalks in or about building structures, but shall not include those made of similar materials which are preformed and laid in Portland cement grout or the contracting therefor;

(d) the waterproofing of any type of structure below or above ground surface with asphalt, pitch, felt, cotton, cement, chemically treated iron, and applying the necessary protection courses, but shall not include the integral waterproofing of mass concrete or the contracting therefor;

(e) the waterproofing of bridges, viaducts, abutments, dams or any other type of non-habitable structure, spandrel beams, columns or any other structural members with any type of material, including the cutting, pointing, caulking and application or waterproofing compound, but shall not include the integral method of waterproofing mass concrete or the contracting therefor:

(f) the dampproofing of interior surfaces of walls of any type of structure with any type of material which may be applied in the fluid or semi-fluid state, whether or not reinforced with fabrics, felts, concrete or the contracting therefor;

(g) the caulking with any or all types of materials of door and window frames as well as the installation with any and all types of materials of expansion joints in connection with waterproofing on any and all types of structures;

(h) the installing and applying of insulation in connection with any of the work included in this Division;

(i) the fabricating, erecting, installing, applying, repairing, servicing or maintaining of sheet-metal work of No. 10 U. S., or its equivalent or lighter gauge and the furnishing thereof in connection therewith, required as part of a specific project on or in bui dings and structures, including, among others, skylights of sheet metal, rolled or extruded shapes the installation of metal ceilings, of warm air furnace heating systems and air conditioning and cooling systems used in connection therewith, of sheet-metal work in connection with heating, ventilating and air conditioning systems, including the mechanical apparatus and equipment when included in the sheet metal contract, of blowpipe and exhaust systems, and of sheet-metal products and equipment used in or for industrial plants, or for agricultural or domestic use, but shall not include the contracting for, or installation of, sheet-metal work manufactured, fabricated or assembled as part of a product of another industry;

(j) the fabricating, erecting, installing, applying, repairing or servicing of sheet metal work and the furnishing of the materials as a part of such contracting, in connection with food service and beverage equipment excluding equipment and accessories manufactured for sale;

(k) the fabricating, erecting, installing, applying, repairing, or maintaining of coppersmith work regardless of gauge, and the furnishing of the materials therefor in connection therewith, when such work is required as part of a specific project on or in buildings and structures, excluding however, coppersmithing work manufactured, fabricated or assembled as part of a product of another industry.

Section 2.—Classification of Employees. Nothing in the definition of this industry shall in any way be construed as affecting the classification of labor employed under this Chapter of this Code.

Section 3.—Contractor. The terms "contractor" and "member of this division", shall include anyone engaged, wholly or in part, in this division as defined in Section 1 of this Article.

* Must be observed in conjunction with CHAPTER I—GENERAL PROVISIONS.

† Captions to Articles and Sections, where omitted in the official draft, have been added by the Construction League to assist the reader.

ARTICLE II

WAGES, HOURS AND GENERAL LABOR CONDITIONS

Section 1.—Exemptions. The following are exempted from the provisions of subdivision B of Section 2 of Article III of Chapter I of this Code:

(a) Employees engaged in a professional, executive or supervisory capacity receiving more than thirty-five ($35.00) per week. However, no employee engaged in a supervisory capacity who performs manual labor shall be included in this exception.

(b) Salesmen and estimators.

(c) Truck drivers, who shall be permitted to work not in excess of forty-eight (48) hours nor more than six (6) days in any one week.

(d) Kettlemen, provided that application is made to and approved by the National Construction Planning and Adjustment Board or proper Regional Boards established by it, requesting that such employees may be exempted from the standard hourly limitation. In no case, however, may such employees be permitted to work in excess of forty-eight (48) hours nor six (6) days in any one week.

(e) Watchmen, who shall be permitted to work not in excess of fifty-six (56) hours in any one week and not more than six (6) days in any seven (7) day period.

Section 2.—Payment of Wages. Wages as they become due shall be payable in lawful currency of the United States, or by negotiable check therefor payable on demand at par. If wages are paid by check the employer shall provide reasonably accessible facilities for the cashing thereof at par without expense to the employee. Employers shall also provide such identification as necessary to utilize such facilities.

Section 3.—No Rebates on Wages. No member of this Division or his agent shall accept rebates directly or indirectly on such wages, or give anything of value or extend favors to any person for the purpose of influencing rates of wages or the working conditions of his employees.

Section 4.—Employer Compliance. Any member of this Division shall be subject to the applicable maximum hourly limitations provided in this Code in the performance by him of manual labor or mechanical occupations customarily performed by an employee.

Section 5.—Subletting Labor Services. No member of this Division shall directly or indirectly sublet to any employee or laborer, the labor services required by any contract secured by such member.

In no case shall a member of this Division avoid or evade the labor provisions of this Chapter by contracting his work to any person or persons subject to labor provisions less stringent than those provided in this Chapter.

Section 6.—Evasion by Re-employment. No employee now employed at rates in excess of the minimum shall be discharged and re-employed at a lower rate for the purpose of evading the provisions of this Code.

Section 7.—**Safety Provisions.** Employers shall make reasonable provisions for the safety of their workmen, at the place and during the hours of their employment, and shall comply with all national, state, or local laws or ordinances referring to safety measures in so far as the same may apply to their work. Standards for safety and health shall be submitted by the Divisional Code Authority to the Administrator within sixty (60) days after the effective date of this Code.

Section 8.—Posting Provisions. Copies of Chapter I and of this Chapter of this Code shall be kept posted by all employers in conspicuous places in their shops and other established places of business which are readily accessible to all of their employees.

ARTICLE III

ADMINISTRATION

Section 1.—**Administrative Agency.** A Divisional Code Authority is hereby constituted to administer this Code within this Division which shall consist of eleven (11) individuals, or such other number as may be approved from time to time by the Administrator. The members thereof are to be elected by the members of this Division pursuant to a method of election approved by the Administrator. In the election of the Divisional Code Authority due consideration shall be given to representation in respect of geographical location and in respect of the various branches of this Division. Members of the Divisional Code Authority shall serve for terms of one year from the date of the election, or until their successors have been elected.

Section 2.—Review of Actions. If the Administrator shall at any time determine that any action of the Divisional Authority or any agency thereof may be or is unfair or unjust or contrary to the public interest, the Administrator may require that such action be suspended to afford an opportunity for investigation of the merits of such action and further consideration by the Divisional Code Authority or agency pending final action which shall not be effective unless the Administrator approves or unless he shall fail to disapprove after thirty (30) days' notice to him of intention to proceed with such action in its original or modified form.

Section 3.—Powers and Duties. The Divisional Code Authority, subject to such rules and regulations as may be issued by the Administrator, shall have such powers and duties as are conferred by subdivision B. of Article IV of Chapter I of this Code, and shall have the following powers and duties also subject to said rules and regulations:

(a) To use such trade associations or other agencies as it deems proper for the performing of any of its activities provided for herein, provided that nothing herein shall relieve the Divisional Code Authority of its duties or responsibilities under this Code and that such trade associations and agencies shall at all times be subject to and comply with the provisions hereof.

(b) To make recommendations to the Administrator for the coordination of the administration of this Code with such other codes, if any, as may be related to this Division.

(c) To cause to be formulated an accounting system and methods of cost finding and estimating capable of use by all members of this Division. After such system and methods have been formulated by the Divisional Code Authority, and approved by the Administrator full details and instructions concerning them shall be made available to all members. Thereafter all members shall determine or estimate costs in accordance with the principles of such methods.

(d) To appoint a Trade Practice Committee which shall meet with the Trade Practice Committees appointed under such other codes as may be related to this Division for the purpose of formulating fair trade practices to govern the relationships between employers under this Code and under such other codes to the end that such fair trade practices may be proposed to the Administrator as amendments to this Code and such other codes.

Section 4.—Expense of Administration. It being found necessary, in order to support the administration of this Code and to maintain the standards of fair competition established by this Code and to effectuate the policy of the Act, the Divisional Code Authority is authorized, subject to the approval of the Administrator:

(a) To incur such reasonable obligations as are necessary and proper for the foregoing purposes and to meet such obligations out of funds which may be raised as hereinafter provided and which shall be held in trust for the purposes of the Code.

(b) To submit to the Administrator for his approval, subject to such notice and opportunity to be heard as he may deem necessary, (1) an itemized budget of its estimated expenses for the foregoing purposes, and (2) an equitable basis upon which the funds necessary to support such budget shall be contributed by members of this Division;

(c) After such budget and basis of contribution have been approved by the Administrator, to determine and secure equitable contribution as above set forth by all such members of this Division, and to that end, if necessary, to institute legal proceedings therefor in its own name.

Section 5.—Notice of Meetings. It shall be provided in the By-Laws of the Divisional Code Authority, or any agency thereof, that five (5) days' notice of any meeting shall be given to any member; such notice shall also be given to the Administrative members of the Construction Code Authority.

ARTICLE IV

FAIR TRADE PRACTICE REGULATIONS

Section 1.—Contractor Qualifications. The applicants for the approval of this Chapter recommend that a contractor should have the following qualifications:

(a) Be generally qualified by his technical training, or experience in the industry to direct properly the application, installation, erection, or repairing of roofing, waterproofing, or sheet-metal work as required in the construction industry.

(b) Be an employer of roofers or sheet metal workers, and protect his employees by compensation insurance and the public by public liability and property damage insurance.

(c) Have an established place of business, have the necessary tools and equipment required in the performance in which he specializes, and maintain an adequate set of books and records.

Section 2.—Contract and Workmanship Standards.

(a) The Standard Form of Contract Documents of the American Institute of Architects is recommended to be the basis to be used for all contracts, provided that the same are approved by the Administrator.

(b) When methods of doing sheet-metal work are not clearly shown on drawings or defined in specifications prepared by architects it is recommended that methods shown in "Standard Practice in Sheet Metal Work," published by the National Association of Sheet

Metal Contractors of the United States, Inc., be used; for slate roofs, methods shown in "Slate Roofs," published by the National State Association; for composition or built-up roofs, the specifications approved by the United Roofing Contractors Association of North America; and any other standards of practice as may be approved by the Divisional Code Authority. Such forms, methods or documents are recommended only when approved by the Administrator.

(c) Members of this Division in any area or in any branch of this Division may adopt and maintain uniform fair and equitable sales and trade regulations provided such regulations and the method of adopting the same have been approved by the Divisional Code Authority and the Administrator.

The following are unfair trade practices, and are prohibited:

Section 3.—Billing Without Records. No member of this Division shall submit an estimate price on any job without retaining a record thereof, or submit a bill for his service without retaining an actual and correct cost record thereof.

Section 4.—No Selling Below Cost. No member of this Division shall sell or offer to sell materials or render services below estimated cost.

Section 5.—Estimated Cost. Until such time as a uniform system of accounting and of cost finding and estimating shall have been determined and shall have been approved by the Administrator, as provided in Article III Section 3 of Paragraph (c) hereof, in which event said system shall be the means of determining estimated cost, estimated cost shall be the sum of the following items of expected cost for the job in question:

1. Materials
2. Labor
3. Job expense, which shall include:
   - (a) Drafting
   - (b) Delivery of materials
   - (c) Transportation for employees, if any
   - (d) Hotel expense for employees, if any
   - (e) Municipal permits, inspection fees, if any
   - (f) Public Liability and compensation insurance
   - (g) Code Authorities' fees chargeable to job.
4. Overhead expenses, excluding items of depreciation on unused facilities, interest on indebtedness, interest on investment or selling expense. (Estimating cost shall not be considered as selling expense for the purpose of this paragraph 4.)

In determining cost as above provided, any contractor who works with tools on any job shall charge his time so occupied on such job at not less than the rate prevailing on such job for employees performing simi'ar work, or, if there be no employees on such job, at not less than the local prevailing rate for employees performing similar work.

Section 6.—Subsection of Materials. No member of this Division shall use or substitute materials inferior in quality to those specified by the purchaser without the consent of the purchaser.

Section 7.—Conforming with Existing Standards. No member of this Division shall use methods of fabricating, applying, or erecting work not in accord with the applicable governmental laws, rules, regulations, or building codes in force in the territory affected.

Section 8.—Inducing Breach of Contract. No member of this Division shall wilfully induce or attempt to induce the breach of contract between a competitor and his customer.

Section 9.—False Statements. No member of this Division shall make, cause or permit to be made or published, any statements concerning the business policies, credit standing, ability to perform work, or labor conditions of a competitor, which are false or inaccurate in any material particular.

Section 10.—Commercial Bribery. No member of this Division shall give, permit to be given, or directly offer to give, anything of value for the purpose of influencing or rewarding the action of any employee, agent or representative of another in relation to the business of the employer of such employee, the principal of such agent or the represented party, without the knowledge of such employer, principal or party. Commercial bribery provisions shall not be construed to prohibit free and general distribution of articles commonly used for advertising except so far as such articles are actually used for commercial bribery as hereinabove defined.

Section 11.—Duplication of Material Orders. No member of this Division shall place blanket orders or future delivery contracts for the same material for a specific job for which he has the contract, with more than one concern when the total so ordered is in excess of the material required or estimated to be required for such job, whichever shall be the greater. Future delivery orders or contracts for specific jobs shall contain sufficient information to identify definitely the job for which the orders are placed.

Section 12.—Accepting Doubtful Settlements. No member of this Division shall accept or give securities, bonds, mortgages, stocks, promissory notes, or other personal or real property as whole or part payment for work or material, at other than the fair market value thereof, to be determined in doubtful cases by independent and competent appraisal.

Section 13.—Not Collecting Payments. No member of this Division shall enter into a contract which provides for the leaving of any portion of the moneys due under the contract as security during the guarantee period, or any portion of that period.

Section 14.—Bonds and Guarantees. No member of this Division individually or with anyone else shall directly or indirectly:

(a) Except for warranties implied in law, guarantee or issue a maintenance agreement, or bond of any form whatsoever on any work described in Section 1 of Article I of this Chapter for a period of more than two (2) years from the date of the completion of the work, or assume in any guarantee, maintenance agreement, bond, or otherwise, responsibility for damage to any structure or to the contents of any structure upon which any such work has been done.

(b) Join with any concern, individual, corporation, or firm engaged in manufacturing, as principal or surety on any bond, guarantee, maintenance agreement, or otherwise jointly guaranteeing the effectiveness of the work contracted for.

Section 15.—Compliance with Heating Code. Members of this Division when they install warm air furnace heating systems and when they make repairs or alterations thereto shall wherever feasible do so in accordance with the Standard Code regulating the installation of Gravity Warm Air Heating Systems issued by the National Warm Air Heating and Air Conditioning Association except where otherwise required by law, provided such Standard Code has been approved by the Administrator. Such Standard Code may be obtainable through the Divisional Code Authority.

Section 16.—Bidding Practices.

(a) No member of this Division shall be a party to the unfair practice of "bid peddling" or "bid shopping" as defined in Chapter I of this Code.

(b) No member of this Division shall submit a competitive bid as defined in Section 1 of Article VII of Chapter I of this Code, to an owner or any other person corresponding to an awarding authority as therein defined, unless such owner or other person agrees to comply with the regulations provided therein governing an awarding authority.

(c) A member of this Division submitting, pursuant to the terms of bidding, a combination bid involving work within this Division and work within other division or divisions of this Industry, shall state in his proposal the price for the work within this Division.

A member of this Division submitting, pursuant to the terms of bidding, a lump-sum bid involving work covered by different branches of this Division shall not be required to itemize the different branches of the work beyond that called for on his invitation to bid except as otherwise required in this Code.

(d) No member of this Division shall accept contracts on a "fixed fee" or "cost plus" basis, with an upset price protecting the owner against higher costs but not protecting the contractor against losses.

(e) Regional or local administrative committees created hereunder desiring to install a method of checking competitive bids shall use either the depository or other method provided by the Divisional Code Authority and approved by the Construction Code Authority, pursuant to Article VII, Section 14 of Chapter I hereof.

(f) Upon notification that the contract has been awarded, or that the bids have been opened, the depository shall deliver all copies of bids for such work to the Local Administrative Committee having supervisory jurisdiction. Such Committee shall open all bids, tabulate same, and send copies of such tabulations, together with details of the contract award, to each bidder who shall pay to the Local Administrative Committee his equitable proportionate share of the cost of handling, tabulating, and distributing such information, but not over one dollar ($1.00) for each bidder.

(g) Upon the request of a bidder, the Divisional Code Authority or a regional or local administrative committee appointed by it shall appoint a committee of review composed of not more than three (3) qualified bidders, who are not bidders on the job, which committee shall be empowered and directed to investigate any bid to determine whether any provisions of this Code have been violated in such bid. In the event such committee shall find any such violation, their findings therein, together with a summary of the facts upon which they are based shall be reported to the Local Administrative Committee or the Divisional Code Authority for such action as may be appropriate.

ARTICLE V
MODIFICATION

Section 1.—Amendments. Subject to the provisions of Section 2(c) of Article IV, B, of Chapter I hereof the provisions of this Chapter except as to provisions required by the Act may be modified on the basis of experience or changes in circumstances, such modifications to be based upon application to the Administrator and such notice and hearing as he shall specify, and to become effective on his approval. Any such application may be made by the Divisional Code Authority.

ARTICLE VI
REGISTRATION OF MEMBERS OF THE DIVISION

Each member of this Division within thirty (30) days after the effective date of this Chapter, shall register with the Divisional Code Authority. All members of this Division who may engage in the Division thereafter shall likewise register with the Divisional Code Authority. Registration of a member of this Division shall include the full name and mailing address of the member. An application may be made by the Divisional Code Authority to the Administrator for an extension of the time limit for the registration by any member of this Division if it appears that the time limit as provided herein might cause injustice or undue hardship to any member of this Division.

ARTICLE VII
REFERENCE TO PROVISIONS OF CHAPTER I

The provisions of Section 7(a) and 10(b) of the Act, which are set forth in Sections 1 and 6 respectively of Article VIII of Chapter I of this Code are specifically incorporated herein by reference with the same force and effect as if set forth herein in full; all other provisions of Chapter I of this Code, including any modifications or amendments thereto, except as herein provided, apply within this Division with the same force and effect as if set forth herein in full.

ARTICLE VIII
EFFECTIVE DATE

This Chapter shall become effective fifteen (15) days after its approval by the President.

Instructions for Code Compliance Procedure

1—Chapter VII, Code of Fair Competition of the Roofing and Sheet Metal Contracting Division was signed by the Administrator on May 10, 1934, and became effective May 25.

2—Our Divisional Code Authority has been elected and submitted to the Administrator for approval, and as soon as approved the personnel will be announced.

3—Elect at Once—Regional, State and Local Administrative Committees.

Regional, State and Local Code Authorities shall be established by election, not by appointment. In holding such election, all subdivisions of the Industry shall have fair representation. No number of members for Code Committees being fixed, it is recommended that the least number to properly represent the industry be adopted.

A contractor operating in two or more subdivisions of the industry may represent more than one such subdivision. Every contractor member of the Industry within the area, whether or not a member of any trade association, must be invited to participate in such election and a copy of notice and minutes of election, together with names and company affiliations of members elect, must be submitted to W. C. Markle, Secretary-Treasurer of the Divisional Code Authority Elect, 429 Fourth Ave., Pittsburgh, Pa., for

his transmittal to NRA for the approval of the Administrator. Quite a number have been elected and are filing the necessary records for approval.

4—Registration—Every member of the Industry must register with the Divisional Code Authority at once. A supply of NRA postal card requests for official posters of the Labor Provisions of the Code have been sent to all known trade associations. Additional copies will be sent on request of individuals or associations. Upon receipt of these requests at the Code Authority office, they will constitute the registration card file conforming with Article VI of our Chapter. The official posters will be sent from the Code Authority office, as soon as they are received from Washington. A request for the Construction Code Eagle does not constitute registration of our Industry.

5—Construction Code Eagle—The Construction Code Eagle is being distributed by the NRA. Members not having received one should apply to their Postmaster or the local NRA Committee.

6—Assessments for Administration Expenses—Until the budget and plans of assessment of the Divisional Code Authority and local, state and regional administrative committees have been approved by the Administrator, the actual assessment on each member of the Division, cannot be announced. Pending such time however, an initial assessment of five dollars ($5.00) to be credited on account, shall be paid by each contractor member of the Industry. In accordance with the Administrative Order issued on April 14, 1934, this sum must be remitted within thirty (30) days to W. C. Markle, Secretary-Treasurer Elect of the Divisional Code Authority, 429 Fourth Ave., Pittsburgh, Pa. Budgets and any proposed plan of assessment must be submitted by local, regional or state Administrative Committee to the Divisional Code Authority as soon as possible for approval by the Administrator. Such local Administrative Committees who desire to collect both the Divisional Code Authority expenses and their own administrative expenses, must obtain approval to collect for the Divisional Code Authority. Industry members of Code Authorities and Administrative Committees are not salaried, but their executive staffs may be paid. Such salaries as well as any ordinary office expense ought to be provided for in the budgets.

All funds collected for Code Administration expense are designated by the Administrator as trust funds and can be used for no other purpose. (Article III, Section 4 (a).)

7—Code Authority Expense—These local, regional administrative committees in submitting their budget and plan of assessment, should give (1) the approximate amount to be collected, (2) the approximate number of members from whom contributions may be obtained, and (3) the proposed method of assessment. This should be clearly stated.

A. SALARIES

(1) Executive Secretary
(2) Executive Officers
(3) Clerical Employees
(4) Other employees by classes.

B. OFFICE EXPENSE

(1) Rent and Light
(2) Office Equipment
(3) Office Supplies
(4) Stationery, Postage
(5) Telegraph, Telephone
(6) Miscellaneous

C. TRAVELLING EXPENSE

(1) Members of the Code Authority
(2) Employees

D. INCIDENTAL

(1) Legal Fees
(2) Accountant's Fees
(3) Insurance
(4) Miscellaneous.

8—Registration of Jobs of $2,000 and Over—Particular attention is called to the fact that all contracts, jobs or services taken on or after May 25th, of $2,000 or more in value, same must be registered through the Divisional Code Authority who in turn will register with the Construction Code Authority at Washington. Failure to register such jobs is a violation of the Code. Forms for registering such projects and the required registration fees will be supplied on request to the office of the Divisional Code Authority.

Checking Competitive Bids—Temporary depository and method for checking competitive bids in any area may be established by elected administrative committee, but full details of proposed method must be submitted to the Divisional Code Authority for approval by the Administrator.

9—Area Agreements—The Divisional Code Authority and local Administrative Committees are not given authority to establish wage rates or working conditions. These must be established in accordance with Article III Chapter I, by special Committees of employers of labor and employees. These agreements must be made by contractors employing skilled labor and by employees. All such agreements are subject to approval of the Administrator before they become effective.

10—Selling Prices are not established by the Code, but selling below cost is prohibited. Under selling below cost provisions, Sections 4 and 5, Article IV of the Code, there is a definite estimating and cost formula which must be followed.

11—Record of Estimates and Billings—Particular attention is also called to Article IV, Section 3, requiring that a record must be kept of all estimates and billings. It is a violation of the Code not to keep such records.

12—Compliance—The Code becomes effective May 25, 1934. It is important to study the provisions of Chapters I and VII carefully. The Code is the Law of our Industry and every one in the Industry must comply with its provisions and pay his proportionate share of the administration cost. Ignorance of the Law is no defense for violation of the Code.

Typical Local Trade Area Outline of Procedure

1. Elect Administrative Committee

Local trade association, if one, or some contractor member of industry must take leadership and invite all known members of industry to meeting for election of Committee, exhausting all sources of information to obtain names. Election must be fair and open with full opportunity for all to present candidates representative of small and large shops. Four (4) copies of sworn record of attendance (8x10½ sheets) giving action taken and full names, connections and addresses of successful candidates must be supplied Divisional Code Authority to submit for approval of Administrator.

2. Administrative Committee Make-Up

Should be small and yet representative of all subdivisions and branches of work defined under Article I of Chapter VII. Organize Committee with Chairman and Vice-Chairman elected by and from members of Committee. The Committee may select a Secretary-Treasurer or Executive Manager from within or without the industry as local conditions and desires may determine.

3. Registration All Members

Committee must take census of all in industry in area in order to know branches of work done by each member of industry and send in "NRA 16-1980 request card for labor posters" to Divisional Code Authority, 429 Fourth Ave., Pittsburgh, Pa., for each member who has not already done so, that they may be supplied a copy of Chapters I and VII as published by said Authority and all subsequent communications and modifications, rulings, etc., thereunder.

4. Definition of Area Under Jurisdiction of Committee

Committee must determine the boundaries of their trade area, adjust same if any overlapping develops with committees of adjoining areas.

(*Continued on page* 54)

Air Conditioning Section

Devoted to the technical and merchandising problems of air conditioning in homes and small buildings

A CONTRACTOR said the other day—"Air conditioning has me going around in circles: there doesn't seem to be any end to the things a man ought to know when he gets into this field."

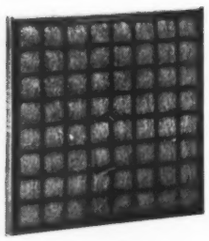
- - - We can sympathize with the gentleman because we are faced with the same problem. There are so many things to publish on air conditioning that sometimes it seems hopeless to crowd into this Air Conditioning Section useful information on all the various angles of the subject.

- - - We should, if we are to cover the field, bring articles on forced air, controls, gas and oil burners, stokers, humidity, cleaning, insulation, stratification, drafts, cooling, plus information on the more theoretical phases of comfort, treating air, psychrometry, and a dozen other subjects.

- - - Your response to our efforts has been gratifying. Hundreds of letters have been received commending, suggesting, asking questions. We want to make the section as helpful as possible—what do you want—your suggestions will be appreciated.

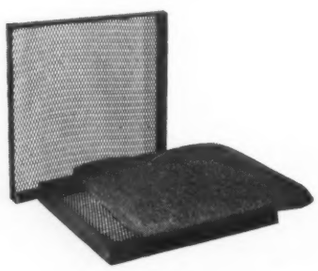
BETTER... because!

The special coating of each strand of split-wire with viscosine, increases its dust catching and dust holding efficiency.



THROWAY

The filter pad is in a cardboard container. Throw the whole unit away when used.



RE-NU

An all-metal renewable type furnace filter. Only the filter pad replaced.

The filter pads for THROWAY and RE-NU filters are fabricated of continuous strands of split-wire, woven by a special process into mats of uniform size and thickness. In the weaving process each individual strand is thoroughly coated with viscosine to assure high grade efficiency and maximum dust holding capacity.

Of the many hundreds of materials suitable for cleaning air that have been tested by American Air Filter engineers none have equalled viscous coated split-wire for low resistance to air flow and high efficiency in dust removal. Its performance characteristics are so outstanding that patents have been obtained covering its use for cleaning air and gases.

Send for Bulletin No. 117-B covering our full line of Furnace Filters. Engineering advice and other information is gladly supplied.

AMERICAN AIR FILTER COMPANY, *Inc.*

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NRA MEMBER U.S. WE DO OUR PART

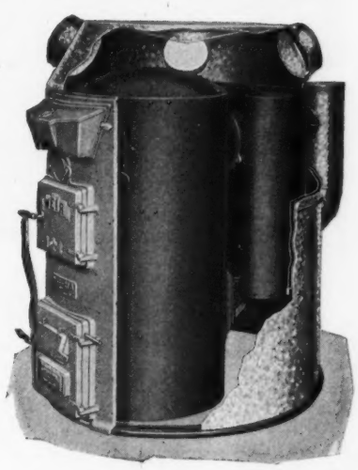
AMERICAN AIR FILTERS

To SURVIVE, You Must COMPETE

(And To Compete Today, You Must Have a Line Which Offers Price As Well As Quality.)

The MEYER-WEIR line has long been known for its unquestioned leadership and a mistaken impression still prevails in some quarters that it is a high-priced line *exclusively;* when, as a matter of fact, it offers steel furnaces in the widest range covering everything from the contract or job where "price" is the major consideration to the most elaborate air-conditioning job where quality and refinements sell.

THE NEWEST ADDITION TO THE MEYER-WEIR LINE



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A full-fledged "Class A" Steel Furnace that enables you to compete on "Price" with WEIR Quality!

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FEATURES:

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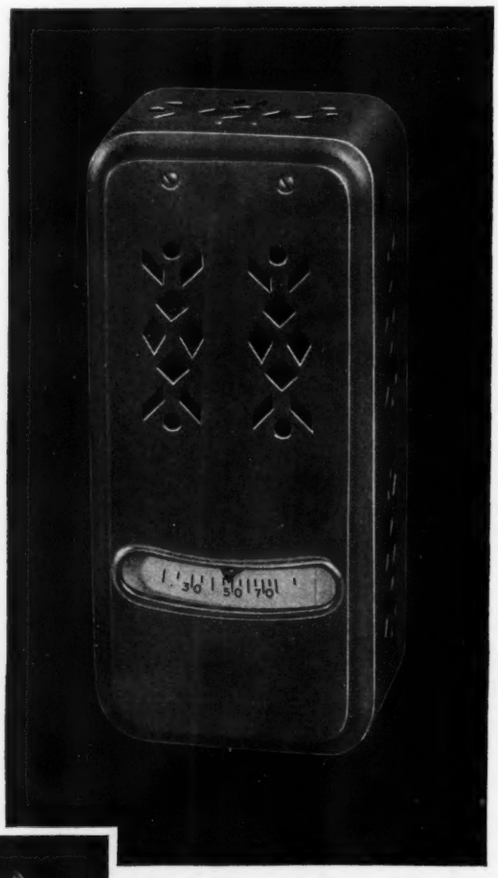


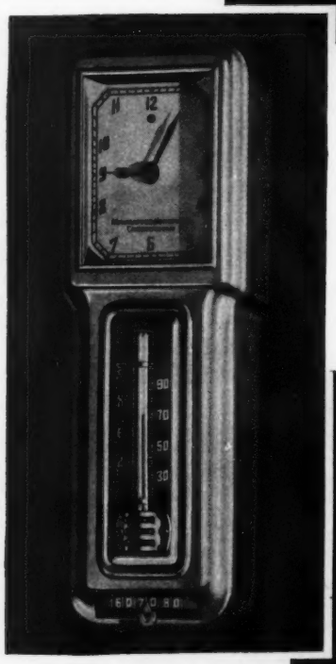
Humidity Control—(above) Very accurate with exceptionally small differential

•

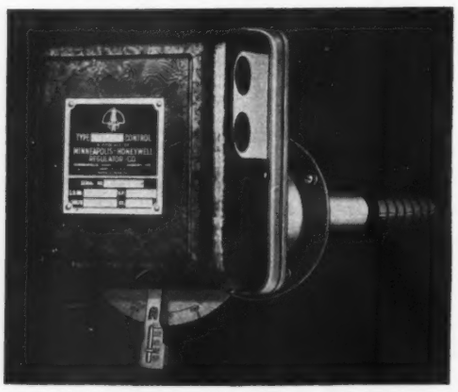
Chronotherm—(left) Provides unvarying temperature and eliminates "Cold 70°"

•

Remote Bulb Temperature Controller—(below) For controlling duct temperature



Air Conditioning Furnacestat—Combination control to govern heat source, fan sequence, water valve and furnace temperature.



MINNEAPOLIS HONEYWELL

Control Systems

Automatic Controls

This article begins discussion of the fourth hookup of our series. In this hookup the fan runs all the time. The room thermostat controls temperatures by opening and closing the draft and check doors. This is probably the most satisfactory basic system yet devised. Little apparatus is required and the wiring is very simple. Three variations of this basic hookup will be discussed in July and August issues.

SO far in this series of articles on controls (the articles began in June, 1933) we have discussed three control hookups. In the first hookup the room thermostat controlled the fire while a bonnet instrument started and stopped the fan at predetermined temperatures. In the second hookup a limit control was inserted in the room thermostat damper motor circuit and so set that too high bonnet temperatures caused the damper to close whether or not the room thermostat was satisfied. In the third hookup (called "keeping heat on the shelf") the room thermostat started and stopped the fan while a bonnet instrument maintained a constant level of temperature in the bonnet irrespective of whether or not the thermostat was calling for heat.

In all three of these systems it was assumed that the fan would run intermittently. It was further assumed that the fan, furnace and house requirements would be so balanced that response to the room thermostat would be satisfactory and that the furnace could keep up with the fan; the fan could quickly change the air and both could meet every requirement of the house.

In discussing these last three hookups many excursions were made into relating facts and conditions—such as how to select and set instruments; common conditions arising in typical installations; balancing of apparatus, etc.

Now we come to the fourth hookup wherein the fan runs all the time and the room thermostat maintains house temperatures by controlling the fire. This is, most contractors will agree, in many ways the best control hookup and the most satisfactory operating system yet developed. The system has not received the favor it deserves chiefly because homeowners usually object to the expense of constant fan operation. (We will have some facts to report in this connection in this discussion.)

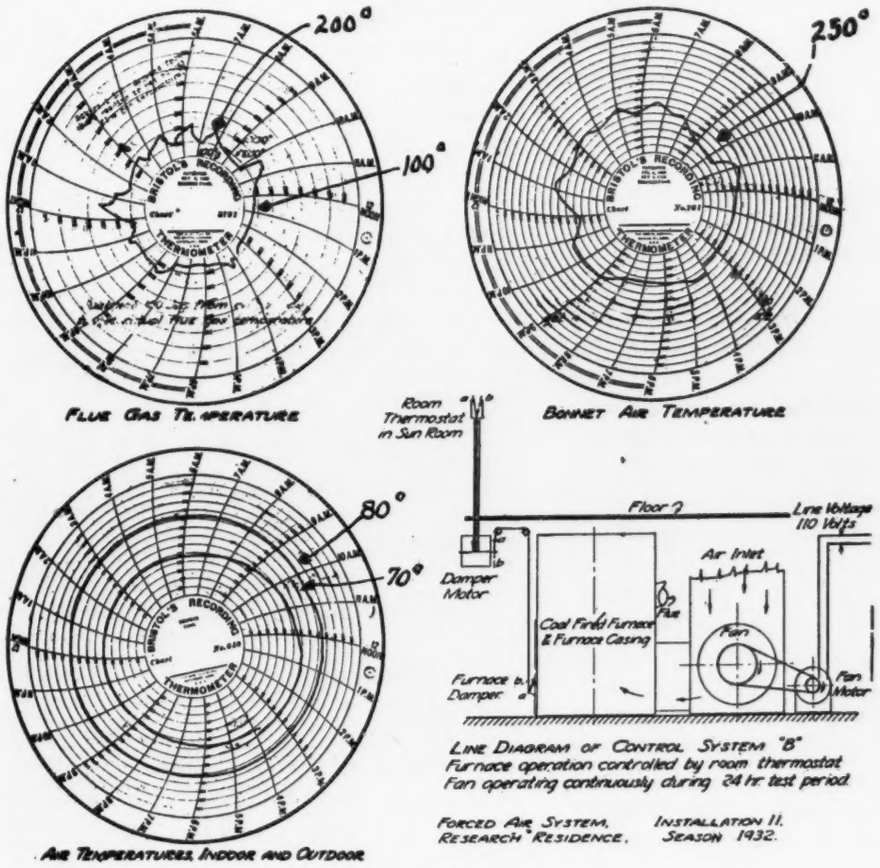


Fig. 1—Room, bonnet air, and flue gas temperatures for hookup where fan runs all the time and no limit is placed on combustion. The wiring diagram is also given. Note the low bonnet and flue gas temperatures and the small variation (about 5 degrees) in room air temperature. The outdoor temperature on this day ranged from 30 to 40 degrees.

(Chart from paper "Automatic Controls for Forced Air Heating Systems," by S. Konzo and A. F. Hubbard, Heating, Piping and Air Conditioning, November, 1933.)

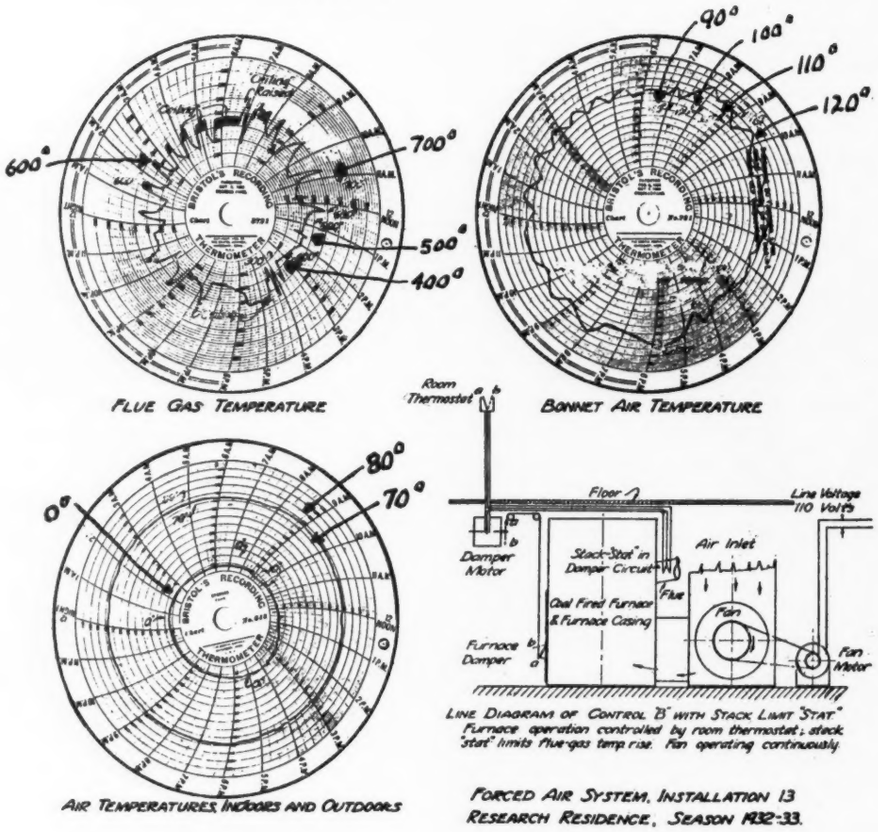


Fig. 2—Room, bonnet air and flue gas temperatures for hookup where fan runs all the time, but a stack limit control is used to place a "ceiling" on combustion. These charts are for a zero day. Without the limit control room temperatures overran during cold weather. Note how the limit control kept room temperatures at an even level.

(Chart from paper "Automatic Controls for Forced Air Heating Systems," by S. Konzo and A. F. Hubbard, Heating, Piping and Air Conditioning, November, 1933.)

Why do we say this is one of the best control hookups?

Intermittent Troubles

To answer, let us review briefly some of the facts every contractor knows from experience. First—In the design of any duct system the contractor tacitly assumes that the air is going to be delivered at the selected velocity and temperature *all the time.* He designs for a certain register air temperature; for a certain number of air changes per hour; he sizes his ducts for this air delivery. But in actual operation the fan does not run all the time.

Second—His piping system (both warm and cold) is sized to friction so that each register delivers its quota of air, *when the fan runs.* But we all know that when the fan stops we usually find the whole system thrown out of balance—returns show little or no air movement; warm air leads reverse; short runs, or some runs, or runs to second floor work on gravity while other runs stand idle or reverse.

Third—In designing for fan work we undertake to completely circulate all the air in the house so many times an hour; we stir up and agitate the air in the rooms; we force warm air over cold glass and wall areas; and we try to eliminate air stratification. Usually we establish all or most of these conditions (depending on how good a designer we are) during those periods when the fan runs.

But we nullify many or most of these good features just as quickly as our fan stops. We no longer circulate the air throughout the house—only some rooms; we no longer heat cold glass and walls; curtains of warm and cold air begin to circulate in parts of each room; and, last, stratification takes place so we have hot ceilings and cold floors.

We've built a good system and designed for every contingency, but we have stymied our work by letting the fan stop.

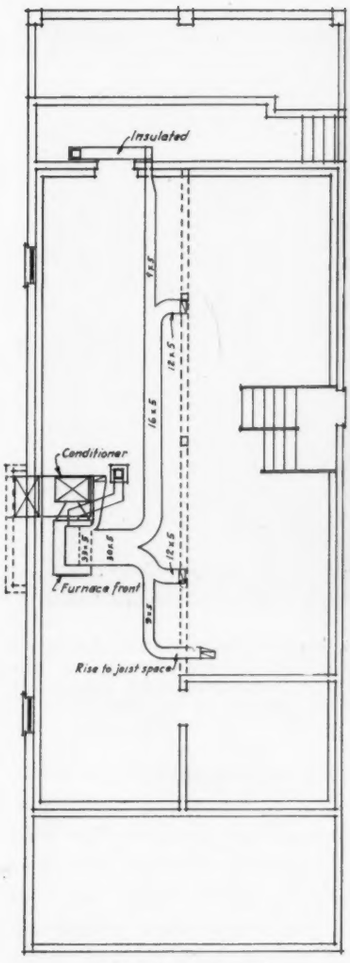
If this discussion seems a bit harsh or criticism too severe, we invite contractors to stop and try to find one of their jobs where some or all of these faults do not show up when the fan stops.

Research Residence Report

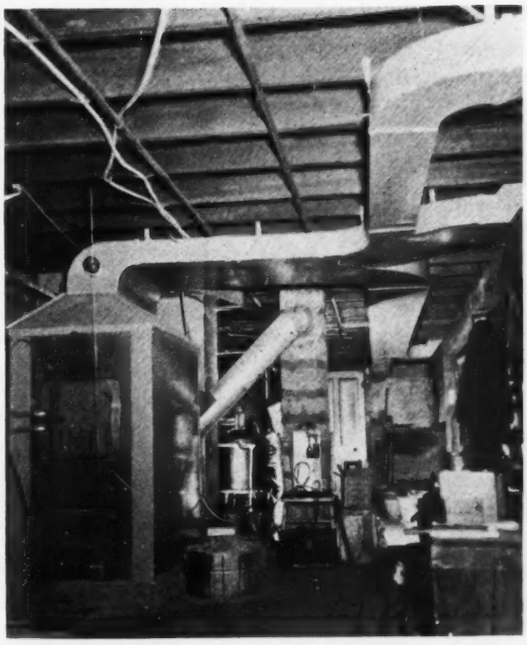
The University of Illinois at the Research Residence reporting on the 1932 tests on automatic controls has this to say about the control system wherein the fan runs all the time: "In this hookup with the room thermostat operating the damper motor directly and the fan running constantly, we found a control arrangement that is very simple and dependable.

"The quantity of air delivered by the fan was practically independent of the bonnet air temperature; consequently, positive and continuous air circulation was maintained and both the air stratification in the rooms and the resulting room air temperature gradients from floor to ceiling were minimized. Also, for a given adjustment of the volume dampers in the duct system, equal temperatures were found to exist in the different

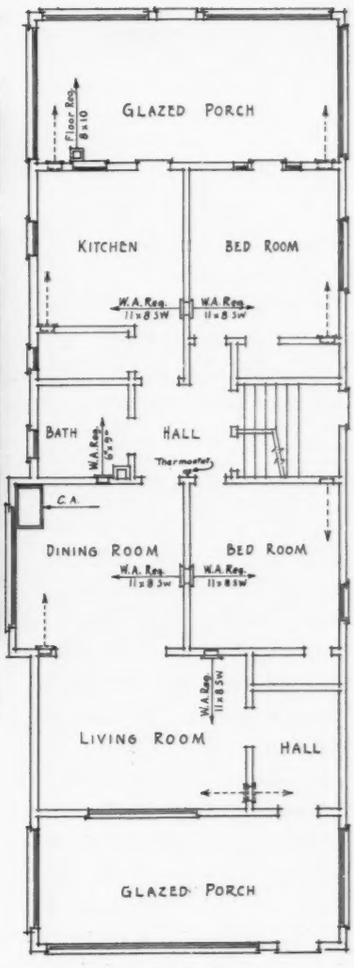
(Continued on page 43)



BASEMENT PLAN



Above, a view of the basement and heating plant; left, diagram of duct system; right, first floor plan showing present registers and suggested system (dotted lines).



FLOOR PLAN

A. A. Test House Number 3 - An Air Conditioned Bungalow

By Platte Overton

THE accompanying plans and data of the AMERICAN ARTISAN test house No. 3 are again offered in a more or less "tell the truth even if it hurts" spirit. These findings are given after due consideration of the fact that they represent a type of system being installed and called "warm air, air conditioning."

The findings in several instances indicate that the design and operation of the system are not satisfactory; nevertheless, truth never harms anyone, and the knowledge gained from one installation which fails to live up to preliminary expectations may be more useful than the knowledge gained from many jobs which operated as designed.

The system as installed in this house can not be termed a success. It failed to function in accordance with the hopes of the designer. The registers and returns were not changed. The mechanical system was installed and as much of the previous system as possible was utilized.

It is the purpose, we believe, of a warm air, mechanical installation to provide the following conditions in the home in which it is installed:

(1) The maintaining of equal and uniform temperatures throughout the entire area of the home.

(2) The maintaining of the proper percentage of humidity, air circulation and temperature conducive of comfort and health.

(3) The securing of an efficiency from the heating unit or furnace that will give the greatest return in B.t.u.'s delivered at the register from the fuel burned.

(4) The establishing of a system of temperature control that will function with a minimum of attention by the occupants, and maintain uniform temperatures.

(5) The elimination of dust in the circulated air, so common to the gravity system.

(6) The beautifying of the basement.

The last item is possibly the only one that has been attained in the No. 3 test house.

Temperatures throughout the house are not uniform. Too much fuel is burned in ratio to the actual building B.t.u. loss. The control system gave trouble from the start and was adjusted only after several changes. The fan is, of course, intermittent in service and during the "off" period, most of the gravity service is delivered to the dining room. The living room has a chronic case of "cold 70," and is comfortable only after the fan has operated constantly for a long period. Strange as it may seem, this room, and its glass surface, is protected from the outside by a glassed-in porch.

The glassed-in porch in the rear of the house, while

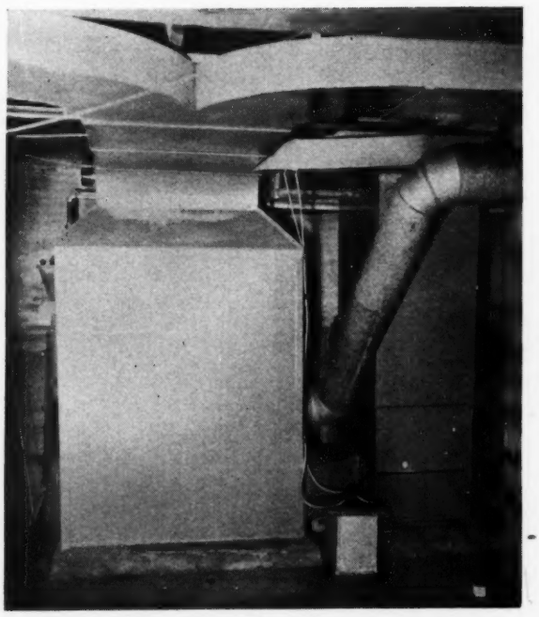
not guaranteed for any temperature above 40 degrees was provided with a warm air inlet to prevent the flowers in this room from freezing. While the fan is idle the run to this room acts as a return. This return air, at about 45 or 50 degrees, moves back through the trunk duct to the first warm air register (in the kitchen) and is carried up into this room with the gravity flow. As a result the kitchen is always cold in severe weather.

The "cold 70" in the living room was not a matter of cold drafts. In fact, there were no drafts. A large overstuffed chair is placed directly in front of the warm air register which does not help the situation.

Suggested Cure

This job sold for around $400.00. The actual heating unit or furnace was sold on price. Thirty dollars more would have furnished an efficient and reliable heater. For another $100.00 the proper inlets could have been provided. These inlets should have been installed 7 feet above the floor line at points marked on the plan with the dotted lines. Returns from every room would not be necessary. Tests during the past heating season on various houses have shown that elaborate return systems accomplish little or no good. Plenty of warm air inlets in the proper location combined with high enough register velocity to assure good distribution of the warmed air over cold outside walls solves the problem. This statement regarding returns may not hold true for very large houses, but it is true for houses of this type and size.

The control system should have been zoned with two zones, one for the rear and the other for the front of the house. Even in cold weather, the afternoon sun on the rear glassed porch will force the thermometer up to 80 degrees. In the cold morning hours the front of the house overheats.



Side view of equipment showing boot tested, design of blower cabinet, one trunk-takeoff and main branching. The motor was first mounted on the concrete block shown, but had to be taken off because of vibration.

Because this installation is so much like hundreds of other small forced air plants a number of supplementary tests on operating characteristics were made to see just what goes on. For instance, the photograph and the drawings show a boot between fan and casing of the type very common to these small jobs. What actually happened to the air blown through this boot?

Tests by traverse using a draft gauge at the locations shown in the sketches developed some interesting facts. The metal tube of the draft gauge was inserted in the boot at the points marked 1, 2, etc., to a depth sufficient to divide the cross section of the boot into twelve equal portions as shown in the drawing. The tabulation of positive pressures shown on the gauge (the same pressures are shown in the cross section) plainly indicate that only the lower two-thirds of the boot was working.

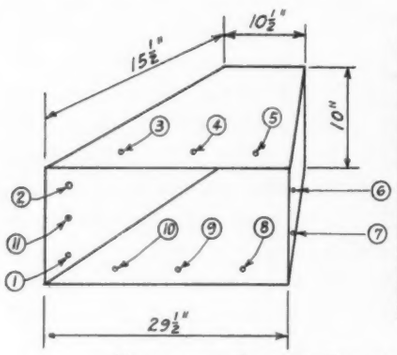
Along the entire upper one-third of the boot the pressures were negative, indicating that the fan was not setting up any pressure throughout this area. So far as efficiency was concerned this upper one-third area might have been blocked off or left out of the boot. Just what results would have appeared had the boot been only two-thirds as high (7 inches instead of 10 inches) was not tested, but will be next season.

Some other interesting tests were run on temperatures occurring in the supply ducts. As shown on one of the drawings high temperature thermometers were placed at four stations and read at predetermined intervals during both fan "on" and "off" periods. A typical series of tests is shown in the accompanying table. The inter-

(*Continued on page* 41)

-.01	-.1	-.015	-.0
.040	.045	.045	.040
.045	.045	.040	.040

Detail of blower boot with chart showing actual air pressures taken while blower was running. Note how top one-third area did not work.



Station	Pressure Loss Reading
1	+0.045
2	+0.015
3	-0.010
4	-0.10
5	-0.015
6	+0.045
7	+0.045
8	+0.04
9	+0.00 -.04
10	+0.045
11	+0.04

PRESSURE GAUGE READING IN BOOT BETWEEN FAN AND FURNACE CASING

Comfort Cooling With Attic Ventilating Fans [Part I]

One of the most authentic tests on the advantages secured by house ventilation using an attic fan or the regular forced air heating system fan was made at the Research Residence in Urbana. The results secured were published in a paper entitled "Study of Summer Cooling in the Research Residence for the summer of 1932." We call attention to the careful procedure used—also to the many valuable facts definitely established.

By A. P. Kratz and S. Konzo

THE experience in the Research Residence, in which between 40 and 45 tons of ice were used during the summer of 1932,* has shown that complete artificial cooling of this class of structures by such cooling agents as cold water or ice, or by mechanical or chemical methods, may be a very expensive process unless some modification is made in the conventional or usual methods of operation or in the structure itself. The most obvious modifications in the structure consist of the use of insulation in the walls and ceilings, and the use of awnings at the sun exposed windows. The use of awnings was investigated during the summer of 1932, and the use of insulation was considered outside of the immediate scope of this investigation. Thus attention was directed toward some modification in the operating schedule.

For the investigation during the summer of 1932 the windows and outside doors were kept closed as much as possible, and the ice plant was started whenever the effective temperature indoors reached a value of 75° F. During the periods of operation, both night and day, the effective temperature was maintained at approximately 72° F, corresponding to a dry-bulb temperature of from 78° to 80° F and relative humidity of about 45 per cent.

A study of the temperature cycles indicated that the minimum outdoor temperature at night was always approximately 20° F lower than the maximum attained during the day, and that during a period extending from 9 p. m. to 6 a. m. the outdoor temperature was 7.5° to 10° F lower than that indoors. During this period the temperature of the inside surfaces of the walls was usually less than that of the inside air, so that all of the cooling of these surfaces had to take place by conduction through the wall to the outside air. Hence it seemed evident that if sufficient air at a temperature lower than that of the inside wall surface could be introduced, these surfaces could cool from the inside, and if the process was continued, the whole structure could be cooled, and the next day started with the entire structure filled with cool air, with the inside wall surfaces and contents at a tem-

Fig 1—View of Research Residence in Urbana, Illinois

*Study of Summer Cooling in the Research Residence at the University of Illinois, by A. P. Kratz and S. Konzo. A. S. H. V. E. JOURNAL SECTION, *Heating, Piping and Air Conditioning*, February, 1933, p. 115. Paper presented at the 40th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, New York, N. Y., February, 1934.

perature lower than would otherwise exist, and with the heat absorbing capacity of the material in the structure increased as a result of the lower wall surface temperatures.

The investigation for the summer of 1933 was, therefore, undertaken with the object of determining to what extent the circulation of air taken from outdoors at night could be used to supplement ice cooling during the day, thus reducing the amount of ice required, and to what extent night air circulation could be used to eliminate the necessity for any additional cooling during the day.

Incidental objects were to determine the relative merits of natural ventilation, of a fan in the forced-air heating system, and of a fan in the attic as means for circulating the air taken in from the outdoors at night, and, if possible, to determine the most advantageous time for opening the windows and starting the fan.

Research Residence and Cooling Equipment

The Research Residence, shown in Fig. 1, together with the forced-air heating system and the ice-cooling plant are well known to most furnace and sheet metal men. For the purpose of this investigation the Residence was equipped with awnings at all east, south, and west windows and the sun parlor was isolated from the rest of the house by means of the doors opening into the dining room. The entire third story was regarded as an attic and during the daytime was isolated from the rest of the house by means of a door at the head of the stairs. The attic windows, however, were opened to provide ventilation in the attic during both day and night. With the exception of the space above the northwest bedroom, the third story had hardwood floors laid on pine sub-flooring. In the space above the northwest bedroom one inch of insulating blanket was nailed to the upper edges of the floor joists. Hence, all second floor ceilings were at least equivalent to lath and plaster with flooring above it. No cooking was done in the kitchen, but the heat transmitted through the glass doors from the sun-parlor, which was not ventilated by opening the windows, compensated for this to a certain extent. In all respects the state of the Residence was comparable for the work done during both summers.

The arrangement of the forced-air heating plant and fan is shown in Fig. 2. For the purpose of this investigation all of the return ducts were blocked unless otherwise specifically stated. For a few tests the outdoor air was taken into the fan through a connection from the nearest basement window. This connection was found to restrict the flow of air, however, and for later tests it was removed, and the fan was allowed to take air directly from the basement, the outdoor air coming in through the open basement door. This fan delivered from 1760 to 2142 cubic feet of air per minute.

The arrangement of the attic fan is shown in Fig. 3. This 24-in. fan was installed in the doorway at the head of the stairs leading from the second to the third story. Thus the air was delivered into the attic space at a point approximately centrally located with respect to the horizontal plane of the third story. It was allowed to escape through windows on all sides. The use of a box and hinged damper on the suction side of the fan, as shown in Fig. 3, permitted outdoor air to be drawn into the open first and second story windows at night, or to be drawn through a duct from a third story window in order to provide positive ventilation for the third story during the day. This arrangement did not interfere with the full capacity of the fan for circulating the air at night, and the somewhat reduced capacity was more than sufficient for ventilating the attic during the day. The fan delivered approximately 4000 cubic feet of air per minute.

During the entire summer from May 23 to Sep-

(*Continued on page* 39)

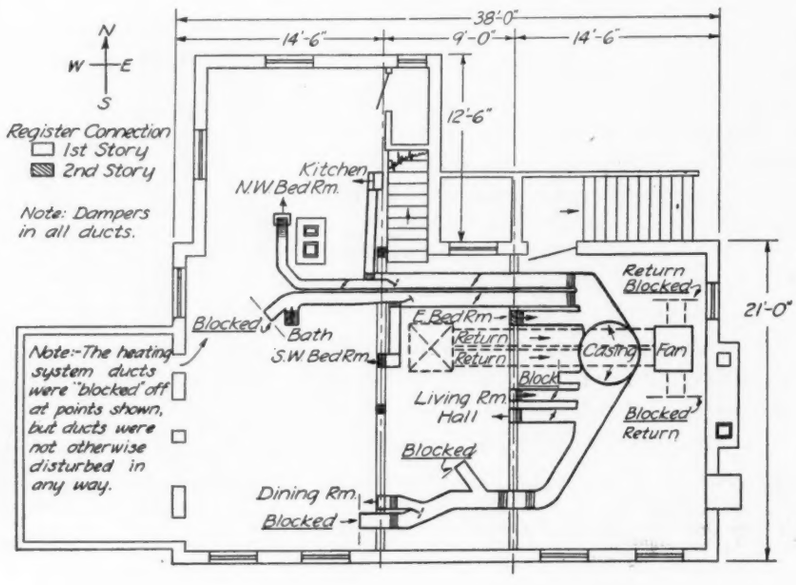


Fig. 2 — Basement plan, showing duct layout for forced-air system in use for distributing cool air

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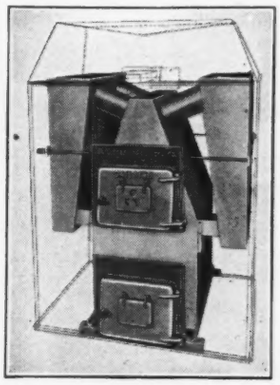

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What Is This Thing Called "Comfort"

By A. P. Kratz
Research Professor
Department of Mechanical Engineering
University of Illinois

Contractors often face the problem of explaining to owners of radiator heated houses just how poor a circulating system they really have. The facts in the matter have been carefully established by laboratory tests. Professor Kratz tells us all about it in this article in his series.

NON-UNIFORM temperatures at the different levels in a room is not confined to one type of heating plant alone, but is more or less common to all types. Figure 9 shows results obtained from a well designed gravity warm air system in which the number of air recirculations varied from 1.8 in mild weather to 3.0 in zero weather. It may be noted that with zero outdoors, or with an indoor-outdoor tempera-

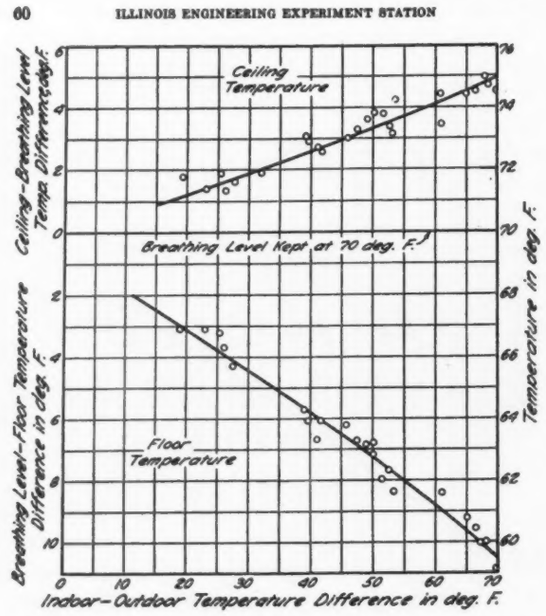
60 ILLINOIS ENGINEERING EXPERIMENT STATION
Ceiling Temperature
Breathing Level Kept at 70 deg. F.
Floor Temperature
Ceiling-Breathing Level Temp. Difference deg. F.
Breathing Level-Floor Temperature Difference in deg. F.
Temperature in deg. F.
Indoor-Outdoor Temperature Difference in deg. F.
0 10 20 30 40 50 60 70
60 62 64 66 68 70 72 74 76

Fig. 9—Curves of floor, breathing line and ceiling temperatures for one test.

ture difference of 70 deg. F. the thermometer at the 5-ft. level indicated a comfortable temperature of 70 deg. F. while the temperature of the air near the floor was approximately 60 deg. F. Hence, the body of a person standing would be surrounded by air at a mean temperature of 65 deg. F. and sitting, at a mean temperature somewhat less than 65 deg. F. In this case the room was not definitely uncomfortable for some people, but was for others. By increasing the temperature to 73° at the 5-ft. level the room could be made definitely comfortable. This may be regarded as a border-line case in which the inside surfaces of the exposed walls were at approximately 60 deg. F. It may also be noted that in milder weather the temperature difference between the floor and the 5-ft. level decreased rather rapidly.

Two characteristic types of radiators are shown in Figs. 10 and 11. Fig. 10 represents a 5-tube radiator, 26-ins. high, rated at 21 sq. ft. of radiation; and

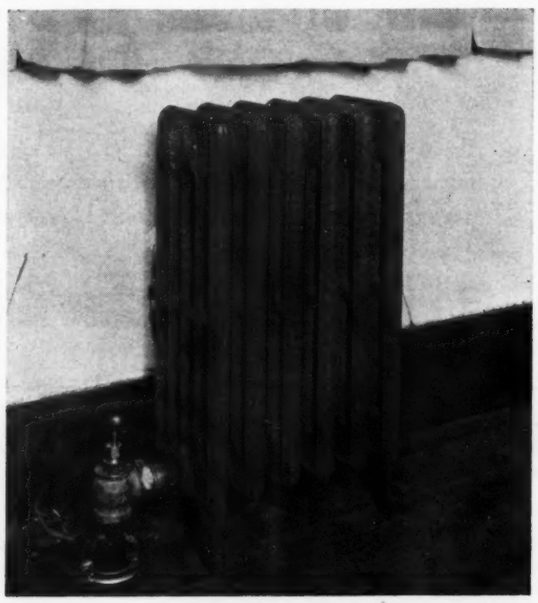

Fig. 10—Six-section, 26-inch, 5-tube, column radiator in cold room of testing plant.

Fig. 11 represents a wall type of radiator, also rated at 21 sq. ft. The temperature variations from the floor to the ceiling and the steam condensations, obtained

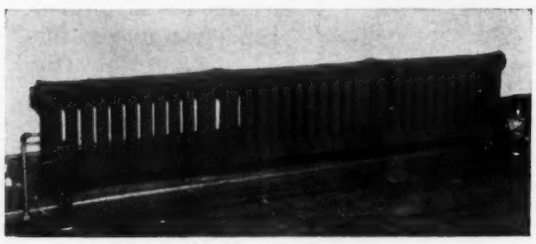

Fig. 11—Three-section, 21 square feet, wall type radiator located near the floor in cold room testing plant.

with the tubular radiator located in the usual position under a window and with the wall radiator located in two positions, are shown in Fig. 12. The tubular radiator produced a temperature of only 55 deg. F. at the floor with 70 deg. F. at the 5-ft. level as being more or less characteristic. Figure 13 shows one of the more open types of enclosures, and Fig. 14 the room

temperature gradient obtained when this enclosure was used in connection with the tubular radiator shown in Fig. 10. The temperature gradient for the unenclosed radiator is also given for the purpose of comparison.

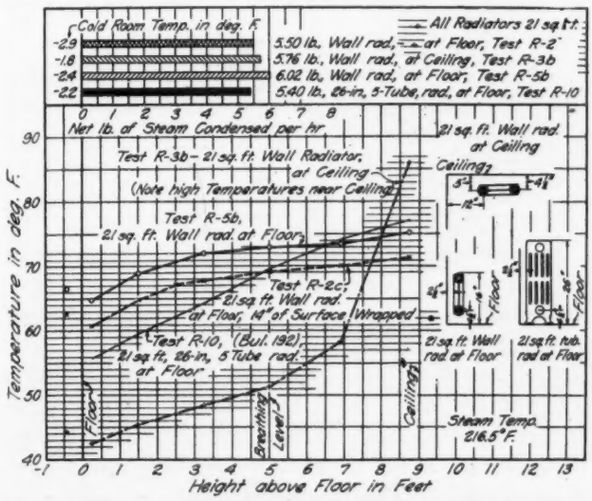
Cold Room Temp. in deg. F.
-2.9
-1.8
-2.4
-2.2
All Radiators 21 sq ft.
5.50 lb. Wall rad., at Floor, Test R-2
5.76 lb., Wall rad., at Ceiling, Test R-3b
6.02 lb., Wall rad., at Floor, Test R-5b
5.40 lb., 26-in, 5-Tube, rad., at Floor, Test R-10
Net lb. of Steam Condensed per hr.
Test R-3b – 21 sq. ft. Wall Radiator, at Ceiling
(Note high Temperatures near Ceiling)
Test R-5b, 21 sq. ft. Wall rad. at Floor
Test R-2c, 21 sq ft. Wall rad. at Floor, 14" of Surface Wrapped
Test R-10, (Bul. 192), 21 sq. ft, 26-in, 5 Tube rad. at Floor
21 sq. ft. Wall rad. at Ceiling
Ceiling
21 sq. ft. Wall rad. at Floor
21 sq. ft. tub. rad at Floor
Steam Temp. 216.5° F.
Temperature in deg. F.
Height above Floor in Feet

Fig. 12—Room temperature gradients and steam condensing rates for enclosed radiators in cold room testing plant.

In this case the use of the enclosure resulted in a higher temperature, and hence more comfortable conditions, in the living zone; and in lower temperature at the ceiling than those obtained with the unenclosed radiator. Furthermore, these results were obtained with less

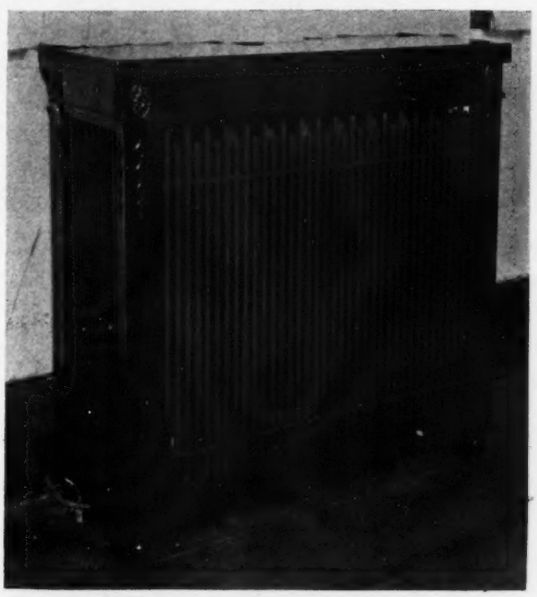

Fig. 13—Enclosure number 3 tested in cold room testing plant.

steam condensation in the case of the enclosed radiator. Thus this type of enclosure proved to be both effective and economical. Figure 15 shows a type of enclosure with restricted air inlet and outlet, and Fig. 16, the results obtained with this enclosure. In this case, while the enclosed radiator showed less steam condensation than the enclosed, no improvement in the temperature gradient was obtained, and the enclosed radiator failed to raise the temperature at the 5-ft. level to

Let the

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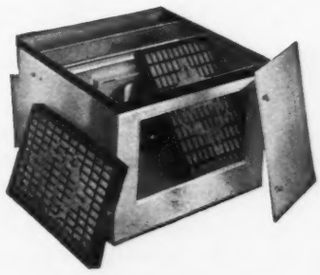

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Install a Miles Junior Air Conditioner in your own home. It gives you the most essential elements of air conditioning—circulating and cleaning the air. The cost is so low you can not afford to get along without it.

But the big benefit will be the conviction and assurance with which you can sell air conditioning. It will put you into the most promising and profitable business available to you today.

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3. Easily cleaned or redecorated.
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6. Flat type grille reduces velocity of air to proper point—diffuses air over entire grille face and causes it to enter room on nearly horizontal plane.
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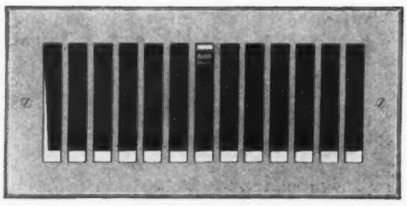

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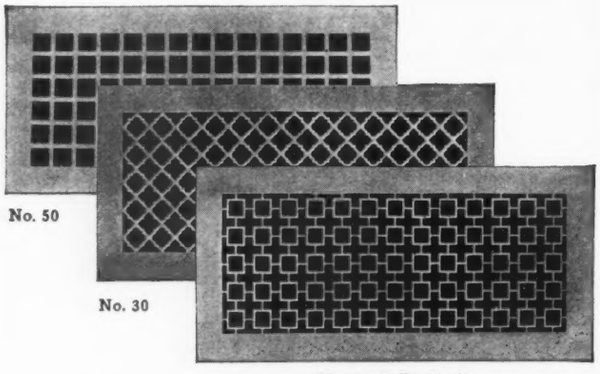
All H & C Forced Air Registers, including one and three-piece sidewall and baseboard types, with return intakes to match, may be had with the No. 60 grille as shown in the one-piece sidewall register above, or any of the three attractive grille designs shown below.



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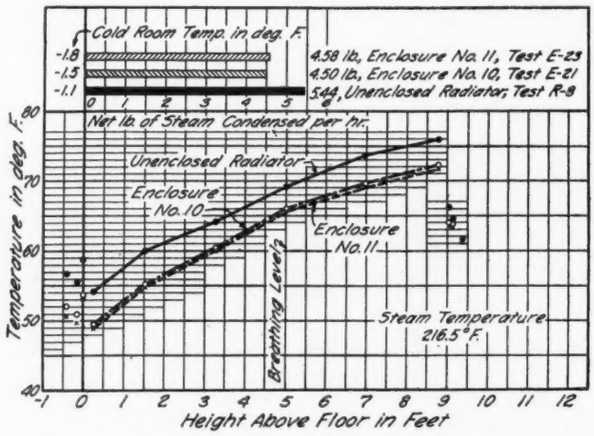


Fig. 14—Room temperature gradient and steam condensing rate for radiator with enclosure number 3.

the 70 deg. F. obtained with the unenclosed radiator. The temperature at the 5-ft. level could have been increased by increasing the size of the radiator, but no improvement in the temperature gradient would have resulted. Hence this type of enclosure can not be regarded as either effective or economical.

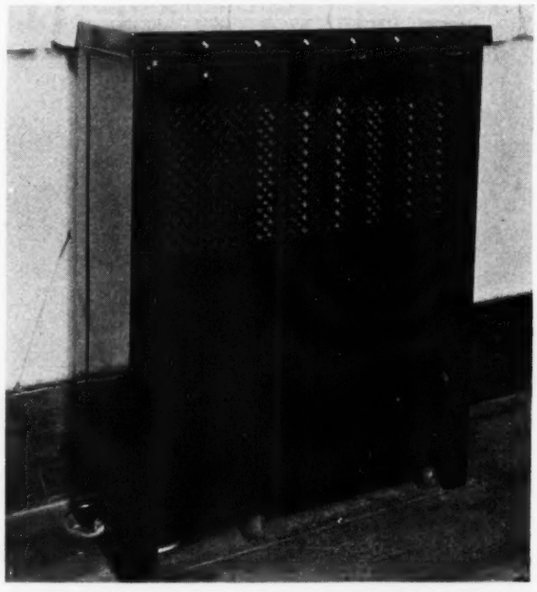
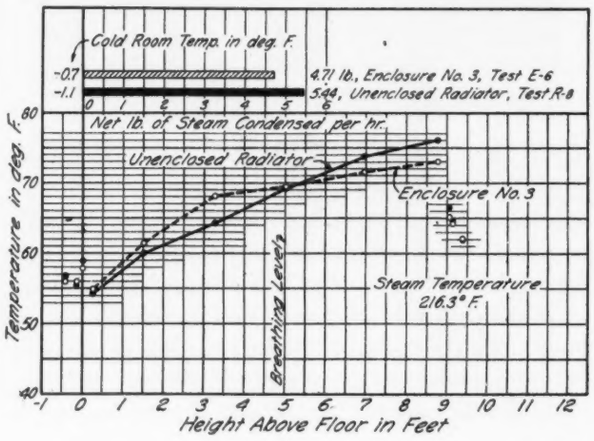


Fig. 15 (above)—Enclosure number 10 tested in cold room testing plant.

Fig. 16 (below)—Room temperature gradients and steam condensing rates for radiator with enclosures 10 and 11.



A White Man's Igloo For 65° Below Zero

TWO thin foils of aluminum, such as one sees on ordinary packages, two thin layers of wood about as light as those used in peach baskets, three to five layers of waterproof building paper, and two ½-inch blankets of kapok are all that stand between Rear Admiral Richard E. Byrd and Antarctic temperatures ranging from 65 to almost 100 degees F. below zero as he lives alone in the world's most remarkable dwelling during the long winter night 125 miles south from Little America.

How does the white man's igloo, designed for transport by airplane, keep him warm when his total daily fuel allotment for both cooking and heating amounts to less than four quarts of a kerosene-like oil, burned in a Primus stove and a reflector heater?

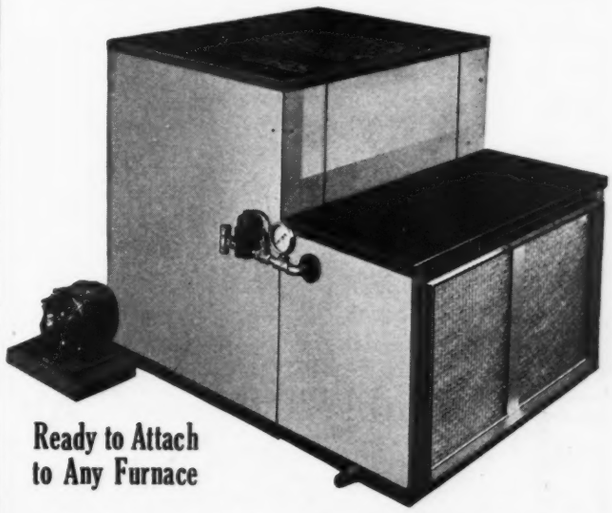
View of house assembled before shipment showing insulation and general construction.

Rear Admiral Byrd's hut is 9 ft. wide, 13 ft. 1 in. long, and 7 ft. 1 in. high, measured on the inside of the room which is the Antarctic home. In addition, there is a porch 4 ft. wide and the length of the hut, the roof of which is supported on three sides by boxes of supplies piled up to the level of the flat roof deck. It is in this porch roof that the famous trap door is placed through which Admiral Byrd can make his way to the surface of the snow should any of his tunnels become choked with ice and snow. There is a door leading from the house to the porch and two wire glass windows in the roof of the house itself. One stove pipe for the Primus stove and a heater, a 6-in. hole in the floor, connected to a vent pipe which extends above the snow level, and two 4-in. vents in the ceiling constitute the only other openings in this modernistic dwelling.

The floor, walls, roof and porch are all made of panels. The wall panels are made up of eight layers of materials as follows:

The inner surface of each panel is covered with (1)

BALMI-AIRE
HOME AIR CONDITIONER



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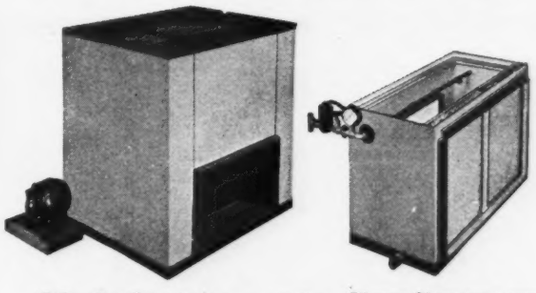
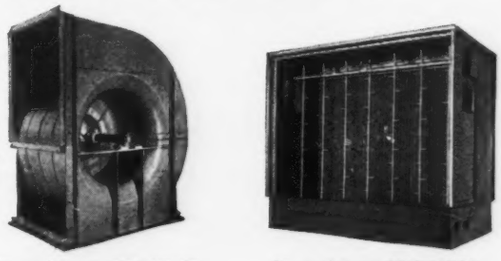
Made in four sizes to fit every home. Designed and engineered by the manufacturers of Kooler-Aire, the famous cooling system used in theatres from coast to coast.



Made in two parts. Blower-filter unit can be installed without air washer, which may be added later if desired.



U. S. AircO BLOWER U. S. AircO WASHER

Sell this complete line of air conditioning equipment—blowers, air washers, exhaust fans. A big, profitable field. Send coupon or write, U. S. Air Conditioning Corp., 2105 Kennedy St. N. E., Minneapolis, Minn.

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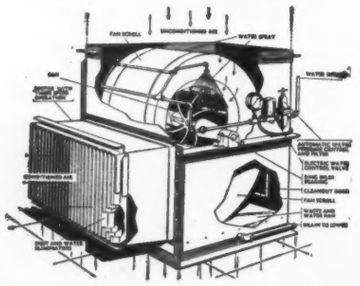

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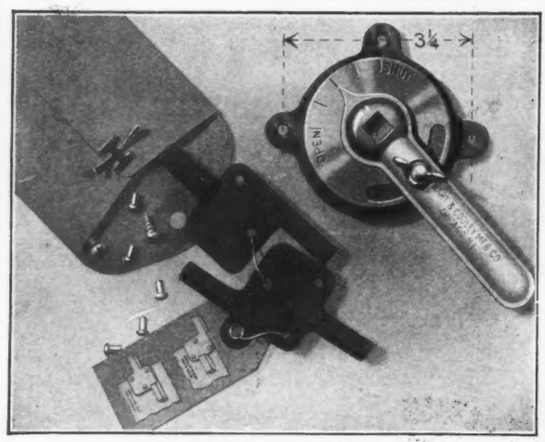

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Most Convenient—Economical

Set shown is a ⅜" size—No. 70-⅜. Regulator, screws, rivets and a pair of combination (regular and splitter) bearings are all contained in one envelope—positive assurance that all parts will be at hand when needed. Regulator has inner disc which moves with handle closing the slot and preventing air leakage. Cadmium finish, sturdy, attractively priced. ¼" size, Set No. 70-¼, is similar, except that regulator has two instead of three lugs. Regulators and bearings also furnished separately. Carried in stock by leading jobbers.

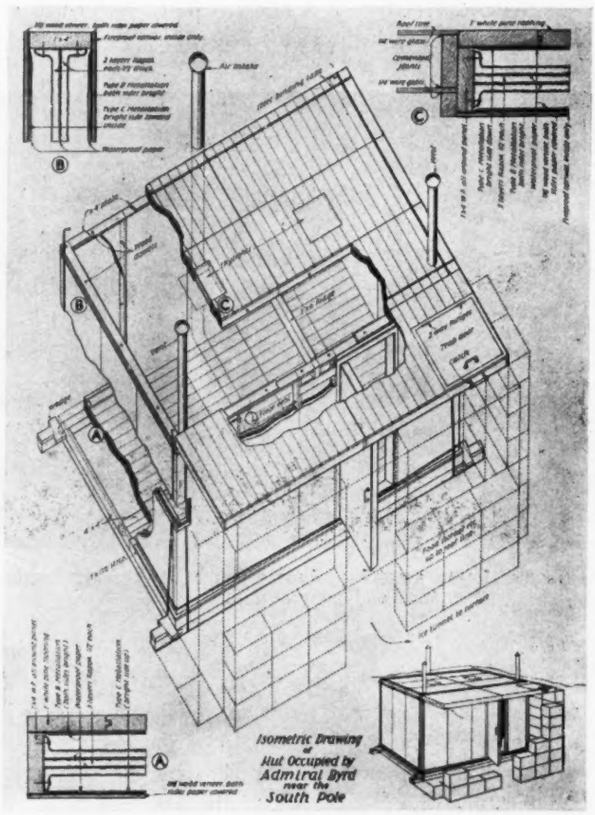
HART & COOLEY MANUFACTURING CO.

61 W. KINZIE ST., CHICAGO

a fireproof canvas. This is applied directly to (2) the kraft-paper-faced thin wood panel lumber ⅛-in. thick. The next layer (3) is Type B Metallation, which is made of heavy kraft paper faced on both sides with polished aluminum foil .0025-in. thick. The Metallation is not glued to the wood panel material, but there is a slight air space formed by the natural bulging of the metal insulation.

The fourth layer is a sheet of reinforced waterproof paper somewhat wavy in character which similarly does not make a uniform contact with the inner bright face of the Metallation. Then comes (5) two layers of kapok blanket each about ½-in. thick, and with no space between the layers except for an intervening sheet of waterproof paper.

Another slight air space intervenes between the kapok blankets and (6) another sheet of loosely installed



waterproof paper; then comes (7) Type C Metallation (foil on only one side) and finally (8) the outer layer of paper-covered wood paneling material.

The edges of these panels were made of white pine boards 1-in. thick and 4-in. wide. When the panels were joined together these light boards were intended to act as the structural framework of the building in place of the ordinary 2x4-in. studs, rafters or joists. This construction gives a multiplicity of air spaces, some of them being a fraction of an inch wide, and two at least an inch wide. The entire panel measures 4¼" overall from face to face.

The roof and floor panels are of substantially the same construction as the wall panels.

Attic Ventilating

(Continued from page 32)

tember 23, continuous records were made, by means of temperature recorders, of the following air temperatures: outdoor, dining room, kitchen, first story hall, living room, east bed room, southwest bed room, northwest bed room, and third story hall. Other incidental air temperatures were observed at regular intervals. Relative humidities both indoors and outdoors were observed by means of an aspirating psychrometer. The outdoor dry-bulb reading on this psychrometer served as a check on the outdoor temperature read from the recorder chart. Surface temperatures of the north, south, and west walls and of the northwest bed room, east bed room, dining room and living room ceilings were observed by means of thermocouples. Thermo-

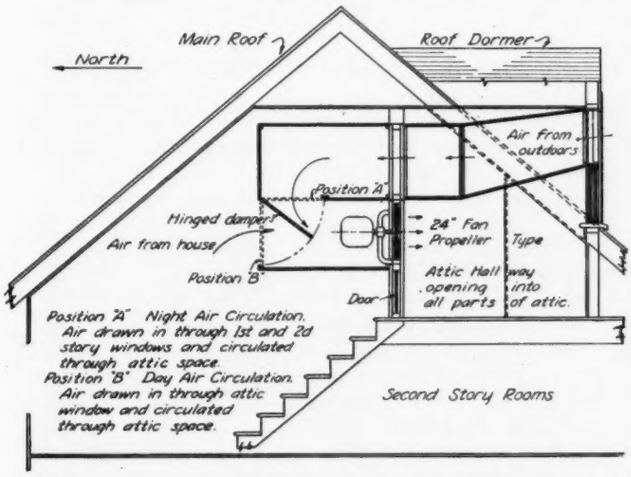

Main Roof
Roof Dormer
North
Air from outdoors
Position "A"
Hinged damper
Air from house
Position "B"
24" Fan Propeller Type
Attic Hallway opening into all parts of attic.
Door
Position "A" Night Air Circulation. Air drawn in through 1st and 2d story windows and circulated through attic space.
Position "B" Day Air Circulation. Air drawn in through attic window and circulated through attic space.
Second Story Rooms

Fig 3—Arrangement of attic fan in Research Residence

couples were also used to observe the surface temperature of tables in the dining room and east bed room. These data were plotted on a continuous chart, and this chart was used as a basis for the analysis of the results.

Twenty-four hours operation constituted a test, and for all tests, with the exception of those in *Series 12,* the attic was ventilated by natural circulation through the windows during the day. At night the natural circulation in the attic was employed for all series except those involving the attic fan. In the latter case the fan delivered the air into the attic, and the circulation was outward through the open windows. The Residence was operated strictly on the schedules described in connection with the following enumeration of the different test series:

Series 1. Restricted Natural Circulation.

8 windows, 4 on the first story and 4 on the second, were opened halfway at 9 p. m. and closed at 6 a. m. on the following morning. The attic door was kept closed.

Series 2. Maximum Natural Circulation.

All windows on both stories were opened wide from bottom and the attic door was opened at 6 p. m. and closed at 6 a. m. on the following morning.

Series 3. Restricted Basement Fan Circulation.

8 windows were opened halfway and basement fan started, circulating outdoor air, at 9 p. m. The windows were closed and the fan stopped at 6 a. m. on the following morning.

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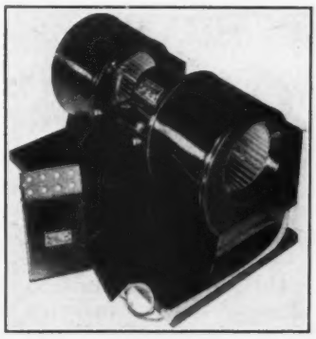
AIR CONDITIONING EQUIPMENT



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DIRECT DRIVE BLOWER UNIT

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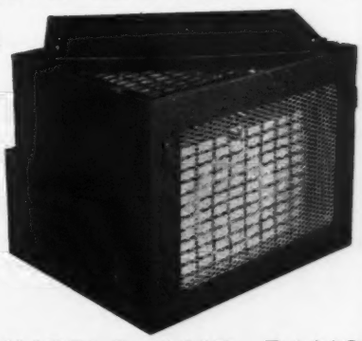

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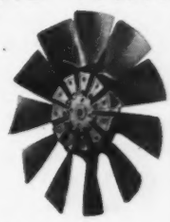

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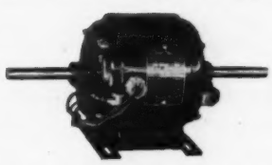

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Please send me full details of your air conditioning equipment.

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Roosevelt says: "RENOVIZE!"

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● A determined effort is being made by the Administration to stimulate the modernization of homes in the lower cost brackets. This effort is certain to create a brisk demand for new furnaces and particularly for blowers and filters with which to add a new air conditioning efficiency to old furnaces.

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NOW STILL LOWER PRICES ON FURBLO

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2 ●—a method so simple yet so effective you'll wonder why no one thought of it before. Use of extra large filtering area overcomes the inefficiency and danger experienced with a small filter surface which quickly builds up resistance. Insures high cleaning efficiency. Yet it's all accomplished without the need for a specially designed blower casing or a specially purchased filter cabinet. In fact, Lakeside furnishes the method and the essential mechanical part *without* cost.

Write for the new prices. Write for the new filtering method. Lakeside is doing everything possible to help you reap a harvest during the Government's modernizing program!

LAKESIDE COMPANY

Makers of FURBLO *and* FAIRWEATHER

HERMANSVILLE, MICHIGAN

(Comparison series with *Series 1.*) 1760 cfm fan delivery or 7.5 air changes per hour.

Series 4. Basement Air Recirculation.

Basement air was recirculated for short period in early evening hours with house closed up. This was followed by circulation of outdoor air by basement fan with all house windows opened wide (1 window in each of 3 second story rooms was opened from top) and attic door opened. The windows were closed and fan stopped at 6 a. m. on the following morning.

Series 5. Maximum Basement Fan Circulation.

All windows were opened wide (1 window in each of 3 second story rooms was opened from top), attic door was opened and the basement fan was circulating outdoor air at 6 p. m. Windows closed and fan stopped at 6 a. m. on the following morning. (Comparison series with *Series 2.*) 2142 cfm fan delivery or 9.1 air changes per hour.

Series 6. Day Cooling with Ice Plant.

The ice plant was operated in the day time until the outdoor temperature had dropped below the indoor temperature, when night air cooling was started, making use of natural ventilation, the basement fan or the attic fan as in *Series 2, 5,* or *8.*

Series 7. Attic Fan Circulation with Windows Opened Half Way (except halls).

The fan was operated from 6 p. m. to 6 a. m. on the following morning. 3980 cfm air delivery or 16.8 air changes per hour. (Comparison series with *Series 2* and *5.*)

Series 8. Attic Fan Circulation with Windows Opened Wide (except halls).

Same as *Series 7* except that the windows were opened wide. No difference in air delivery.

Series 9. Room Cooling Unit on First Story.

The room cooling unit was operated on first story in day time. Night cooling with the attic fan same as in *Series 7* and *8* except for starting time.

Series 10. Attic Fan Circulation with Only Second Story Windows Open Wide.

The fan was operated from 6 p. m. to 6 a. m. on the following morning. 3980 cfm air delivery or approximately 33.6 air changes per hour on second story.

Series 11. Natural Circulation with Only Second Story Windows Open Wide.

Same as *Series 10* except natural circulation in effect. Attic door open.

Series 12. Attic Fan Circulation in Day Time Through Attic Space Only.

Night circulation same as *Series 8* attic fan circulation.

For the purpose of comparing the fan circulation with natural circulation the series of tests may be divided into three related groups. The first group consists of *Series 1* and *3,* the second of *Series 2, 5, 7* and *8,* and the third of *Series 10* and *11.* Other comparisons, of course, may be made between groups.

When night cooling with outdoor air was used to supplement cooling with ice in the daytime, as in *Series 6,* the cooling plant was adjusted so that the rate of ice meltage could not exceed the equivalent of 700 pounds, exclusive of the basement loss, in about 5 hours. After closing the windows and stopping the fan in the morning the indoor temperature was allowed to rise until it reached 81° F, at which time the cooling plant was started. This was allowed to operate at a constant rate until the entire 700 pounds of ice were melted unless the indoor temperature decreased below 79° F, or unless the outdoor temperature dropped more than 3° F below the inside temperature.

Test House

(*Continued from page 30*)

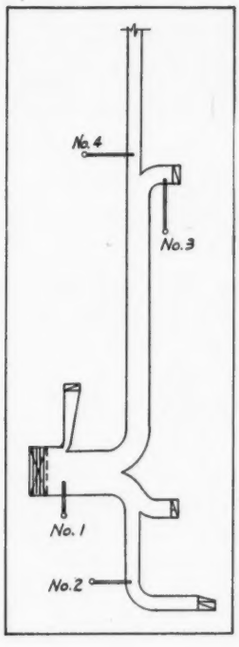
esting fact appearing in these tests is the uniformity of temperature shown at all four stations while the fan ran (even for long periods) as compared with station readings while the fan was idle. In view of the rapid unbalance in temperatures the observers were not particularly surprised at the uncertain interior conditions obtained in the different rooms. Some related facts on this point will be made a paragraph or two later.

Temperature Loss in Trunk Line

Station Number	FAN OFF		FAN RUNNING CONTINUOUSLY					Fan off 35 minutes — no damper opening.	FAN ON
	2:30 P.M.	2:45 P.M.	2:50 P.M.	2:55 P.M.	3:00 P.M.	3:12 P.M.	3:30 P.M.		4:05 P.M.
4	60°	55°	138°	130°	128°	121°	114°		145°
3	80°	80°	138°	135°	130°	121°	120°		149°
2	194°	195°	130°	120°	115°	120°	120°		125°
1	270°	260°	133°	125°	121°	122°	113°		137°

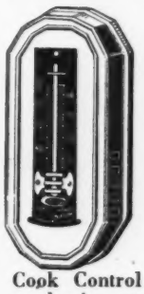
Attention is also called to temperature drop shown between thermometers. Thermometer at station number 1 was placed far enough out in the duct so that radient heat was cut off by the elbow in the duct. When the fan was idle the temperatures invariably rose to above 250 degrees after a damper open period.

From station number 1 to station number 4 the temperature drop during every fan "off" period exceeded 200 degrees, considerably more than the proportionate drop between stations 1 and 2. As reported earlier in this article, it was found the sun porch branch reversed each time the fan stopped and the cold air



Left—Piping plan showing thermometer reading stations. Some interesting results occurred at stations 3 and 4.

COOK HEAT CONTROL



Complete Thermostat Transformer Control Kit **$15.00**

Cook Control has no moving parts to lubricate; no mechanisms to adjust; no motors, springs, gears or dry batteries. There is no service.

FIRING CLUTCH. When refueling, by pushing in the clutch button the control instantly moves into neutral position with both draft and check doors closed. The control automatically re-engages itself after three minutes, and is again under the control of the thermostat.

SAFETY FEATURE. In event of current failure, the COOK Heat Control will always close the draft and open the check door.

Installed at a price so you can pay a salesman a commission, keep a profit and make a satisfied customer.

Write for full details.

COOK ELECTRIC COMPANY
2700 SOUTHPORT AVE., CHICAGO

HESS FURNACE AIR CONDITIONER BLOWER FILTER UNIT

HESS AIR CONDITIONING FURNACE

While in Chicago for the World's Fair, dealers are cordially invited to visit two exhibits of Hess equipment in Home Planning Hall and to visit our factory.

Hess or Benefactor Welded Steel Furnaces of modern rectangular shape represent the best in quality and performance. The Benefactor is our price leader. Investigate—it will make profits for you.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE., Founded 1873
CHICAGO, ILLINOIS

Send for this New Booklet

If you are interested in making money thru the sale and installation of fans, coolers, and other air conditioning equipment — you'll want one or more copies of the newest Buffalo catalog.

This booklet shows the types and sizes of fans, blowers, cooling units and other special equipment that the air conditioning contractor will need. The catalog number, with price sheet, is #2944.

WRITE TO

Buffalo Forge Co.
497 Broadway, Buffalo, N. Y.
In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

on fans, blowers and cooling units for AIR CONDITIONING

from the porch used the register at station number 3 as a flue.

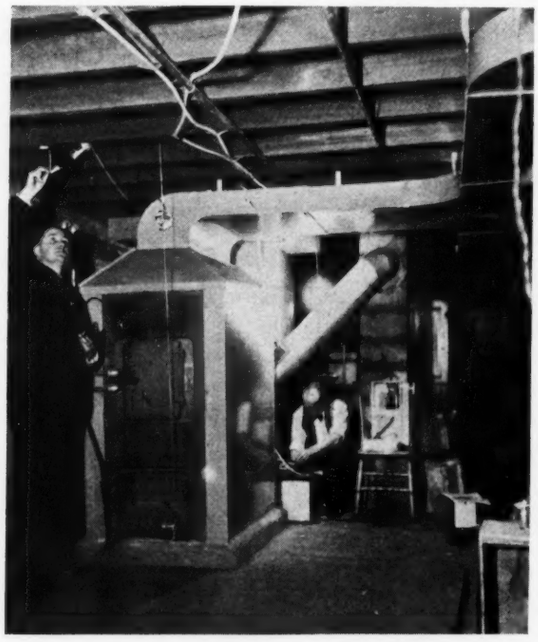
Comment by Albert Wilkins, Cook Electric Co.

Here is a case where zone control is plainly indicated. The arrangement of the rooms is such that even temperature throughout the house is almost impossible by single thermostat control.

By way of compromise, two hook-ups were used.

The first hook-up had the room thermostat controlling the draft and check; while the blower was controlled by a bonnet control from bonnet temperature.

This hook-up was more satisfactory than the second because it caused the blower to operate for a longer



Testing the plant and changing control system

time during the twenty-four hours of each day. However, there was an override of temperature, though it was not very objectionable.

The second hook-up was used because of an objection of the house occupants to the blower operating during the night. In this hook-up the thermostat controlled both blower and dampers. A bonnet control was used to prevent the blower from starting if bonnet was not warm enough, and to close the draft when the bonnet reached a sufficiently high temperature.

The thermostat was located in about the center of the house and maintained the temperature at that point very nicely. However, the two ends of the house were uncomfortably cold a good deal of the time because having an unusually high loss they cooled much faster than the center where the thermostat was located. Placing the thermostat at either end of the house is unsatisfactory because that would have caused the center of the house to be greatly overheated.

This house would give (almost?) perfect heating satisfaction if divided into three zones.

Automatic Controls

(*Continued from page 28*)

rooms of the house for wide ranges of outside weather conditions.

"The temperature charts of the test indicate that the temperature of the bonnet air and flue gas were very low. These low temperatures were conductive to a condition of maximum bonnet efficiency and, in view of minimum heat losses from the ducts, of maximum register efficiency. Since the air movement through the register outlets was constant, the register air temperatures were necessarily reduced appreciably in very mild weather causing perceptible drafts in the vicinity of some of the register outlets.

"The temperature charts of the test indicate further that the flue gas and room air temperatures tended to over-run slightly after each opening of the furnace damper, but the over-runs were not serious if the room thermostat was sensitive.

"The use of a stack limit thermostat, placed in the flue, to close the furnace damper when the flue gas temperature rose to a predetermined temperature setting tended to minimize all temperature over-runs. Our operating charts made on a very severe day, illustrate the results obtained with the stack limit control when used and set to prevent flue gas temperature from exceeding approximately 600 degrees F. Due to the use of this stack limit thermostat, which was set for a temperature high enough to handle the severest weather conditions, a definite ceiling was placed on the flue gas temperature.

"The advantages of this control system may be summarized thus:

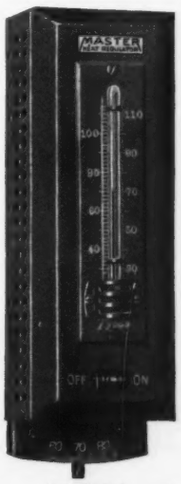
1—Simplicity of control system.
2—Maximum bonnet efficiency and minimum heat loss from ducts.
3—Low register air temperature and small air temperature gradient from floor to ceiling in all rooms.
4—Positive and continuous air circulation, minimizing air stratification.
5—Low flue gas and furnace casting temperatures.
6—Equal temperatures in the different rooms of the house for all outdoor weather variations.
7—Over-run in room temperature warns occupant of any danger from unchecked combustion.
8—Conditions of operation identical to the conditions assumed in the design of the forced air plant.

"There are some disadvantages which may be listed as follows:

1—Slight over-run in room air temperature after each furnace damper opening.
2—High cost of fan operation.

More Profits for You!

Sell this dependable heat regulator with your heating installations



TYPE 144

DON'T make people go elsewhere for equipment you can sell and install at a handsome profit. With the MASTER Heat Regulator you can offer instant, positive temperature control, long life, unfailing operation.

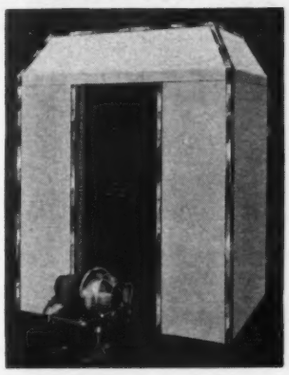
Acts instantly upon changes of ONE DEGREE or even less, if desired. Has platinum-iridium contact points, powerful, quiet motor, non-inductive starting switch, sensitive thermostat.

Hooks to regular lighting circuit—easy to install. Our proposition is a money-maker and a business builder for dealers. Write us today.

WHITE MANUFACTURING CO.
2362 University Ave. St. Paul, Minn.

MASTER HEAT REGULATOR

BARD OIL AIR CONDITIONING FURNACE



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Converts prospects into orders
Beautiful appearance
Low cost

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The BRYAN PLUMBING & HEATING CO.
213 W. Butler St., Bryan, Ohio

for **Registers**

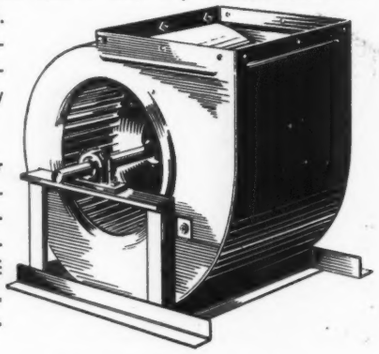
WATERLOO
DIFFUSER
FOR FORCED AIR

specify **Waterloo**

Adjustable control of air direction, volume and velocity.
Write for illustrated catalog
The WATERLOO REGISTER CO., Waterloo, Iowa
Also 2211 First Ave., Seattle, Wash.

FAN WHEELS and ASSEMBLIES

FURNACE manufacturers find Clarage a dependable source of supply for centrifugal fan wheels, or complete assemblies as shown. Clarage equipment is highly efficient and extremely quiet in operation, with sizes to meet any volume demand at any desired speed. And back of this modern equipment is almost a quarter century of experience.



We can handle your fan problems economically and satisfactorily. An inquiry will convince you. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

CLARAGE

AIR HANDLING AND CONDITIONING EQUIPMENT

WRITE FOR COMPLETE INFORMATION

FORCED AIR REGISTERS and GRILLES

Independent Register Leads the Way

Have you a copy of catalogue No. 33 FA?
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INDEPENDENT REGISTER AND MFG. CO.

EXHAUST FAN BARGAINS

There are PROFITS for you in these New Fans at less than used prices.

9" 4-blade	600	C.F.M.	$ 6.00
10" 6-blade	800	C.F.M.	8.00
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13" 6-blade	1200	C.F.M.	10.00
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18" 6-blade	2200	C.F.M.	18.00

For 110V, 60 Cycle, Single Phase, Direct Current at a slight extra cost.

We also have a number of 4½", 6", 7¼" and 9" Blowers at Special Prices. Write for complete list.

AIR CONTROLS INC.
1960 West 114th St.
Cleveland, Ohio

3—Too low register air temperatures in mild weather operation. If, for instance, a fan was selected on the basis that 2,000 c. f. m. air delivery would be required at a register air temperature of 135 degrees in order to handle the heating load for an extreme weather condition, then for small heating loads the register air temperatures will be very much less than 135 degrees and, since the fan air delivery is constant, excessive motion of relatively cool air near the register outlets may result in discomfort.

"The merits of continuous fan operation in a system are many, and in some cases, particularly in large installations, its advantages far outweigh its disadvantages. Three suggestions are offered which would overcome to some extent the disadvantages enumerated before:

1—Make changes in the register outlets so that by use of suitable diverters to spread the air stream and reduce the velocity, or by the use of high sidewall registers the flow of air from the registers can be made unobjectionable, even for low air temperatures at the register outlet.

2—Assume a higher design temperature for the register air, of say 160 degrees, and select, on this basis, a fan with smaller air capacity.

3—Arrange for a two-speed drive on the fan motor, so that the fan speeds can be regulated to maintain a more uniform register air temperature for all heating loads. The low speed drive would be used for say four-fifths of the heating season, and the high speed drive only for extremely cold weather."

In keeping with our effort to present all the various phases of each control system and to point out all the factors involved in the selection of instruments and settings and to give a complete understanding of the facts which must be known if a system is to serve satisfactorily we believe that constant fan operation offers three distinct variations. These are:

1—Fan runs all the time—c. f. m. remains constant—register air temperature varies according to the condition of the fire which, in turn, depends on the room thermostat.

2—Fan runs all the time—c. f. m. remains constant—register air temperature is mechanically varied according to the immediate needs of the house by mixing cold and hot air at the furnace plenum by use of mixing dampers.

3—Fan runs all the time—c. f. m. is varied over two or more speeds by use of variable speed motors, variable speed drives, etc., register air temperature varies according to the condition of the fire which, in turn, depends on the call of the room thermostat.

These three principal variations of the constantly running fan system will be discussed in coming issues.

NOW..Meet the Pacemaker of the Automatic Coal Burner Line that is making AMERICA'S FASTEST CLIMBING SALES INCREASES

Below—The Butler Model 25—"The Automatic Heating Marvel"—Priced within the budget of small home owners.

For a decade Automatic Heating with COAL has been coming into its own. In the last three years it has taken full command. Last year the only automatic heating equipment to show sales increase was the Automatic Coal Burner.

Three years ago, following nearly 7 years of development, the Butler Automatic Coal Burner entered the national market—fully engineered to handle all grades of bituminous coal more efficiently than it was ever burned before.

For three successive years America's fastest climbing sales increases have been made by the Butler Automatic Coal Burner. Already this year's sales increases are breaking all previous records. Smart dealers the country over are swinging into full stride with the pacemaker.

Always—the Pacemaker Is the money maker for Dealers

Twelve sizes in the Butler Automatic Coal Burner line enable you to get the business in the whole range of residential and commercial heating. Pictured above is the Pacemaker of the line. To it goes the prize for design that is both trim and practical. Its unrivaled efficiency quickly titled it "The Automatic Heating Marvel."

For the first time a full-fledged, underfeed coal burner is priced within the budget of the small home owner. It is easy to own. It is easy to sell. It is flexibly engineered for adapting to all types of furnaces and boilers and to all grades of bituminous coal.

The Model 25 is everything dealers have wanted—a sales leader, a star performer and a money maker. It is to be found only in the sales kits of Butler Automatic Coal Burner dealers.

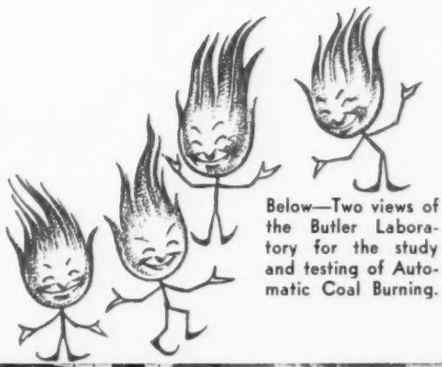
Factory Sponsored Dealer Merchandising Program Is Concentrated at the Point of Sale

The public wants economical automatic heating. It is ready to do business with alert, dependable, local distributors.

The Butler Automatic Coal Burner provides economical heating at its best. The Butler merchandising program quickly establishes qualified dealers as headquarters for economical automatic heating.

It is a studied and tested program which equips the dealer organization with a thorough knowledge of automatic heating with coal, coaching by factory sales engineers and cooperative newspaper and direct mail advertising that is concentrated at the dealers point-of-sale and which dominates in his territory.

It is a program that places directly behind the dealer the resources of a 35 year old institution which enjoys the highest commercial rating and a nation-wide reputation as the manufacturer of high quality equipment



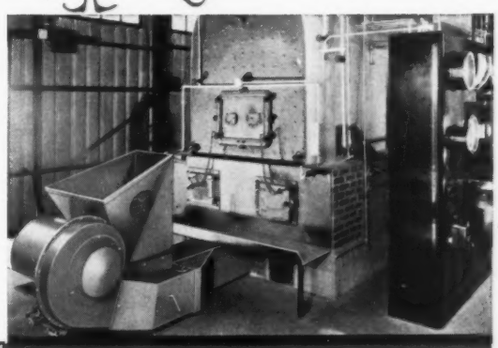
Below—Two views of the Butler Laboratory for the study and testing of Automatic Coal Burning.

Back of the Record Is This Completely Equipped Testing Laboratory

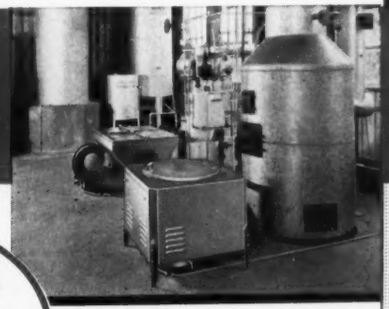
At the Butler Kansas City factory is, we believe, America's most completely equipped laboratory for the scientific study and testing of Automatic Coal Burning. It is a proving ground where Butler Automatic Coal Burners are applied to all types of boilers and furnaces and to all grades of coal. Here power or heating conditions peculiar to any dealers territory may be worked out in advance. From the dealer standpoint it represents the difference between selling just a machine and selling dependable, economical automatic heating.

Sensitive apparatus count and control heat units at work. On the master instrument board are recorded accurate data on flue gases, draft pressures, burning rates and burning temperatures from a dozen vital points throughout each heating unit.

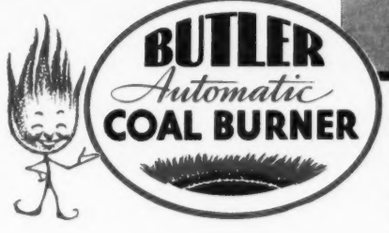
The Butler staff of combustion engineers leaves nothing to theory or chance. Recorded observations of exhaustive tests under every conceivable firing condition reveal the balanced ration of fuel feeding and air distribution that produces the greatest possible efficiency. Only the flexibly engineered Butler, with its adjustable system of air distribution and automatic air draft regulator, permits this "tailor-making" to fit top efficiency with all grades of coal and types of heating units.



Here America's Foremost Combustion Engineers Make Heat Units Work More Efficiently Than They Ever Did Before



Here Butler Automatic Coal Burners Are Tailor-Made to Fit All Grades of Coal—All Types of Boilers and Furnaces



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Firm Name .....

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UNIQUE Mercury-pool Test Shows Value of "Cushioned Power"

A FEATURE OF THIS G-E MOTOR FOR AIR CONDITIONING

WAVES—set up by inherent motor vibrations. The mercury surface clearly reveals the presence of vibrations on top of motor.
RIPPLES—excited by vibrations from side of motor. Such vibrations may become audible if transmitted away from the motor.
NO WAVES—even the sensitive mercury surface cannot detect any vibrations. "Cushioned Power" has isolated them.

THE mercury-pool test provides a visual means of checking the effectiveness of G-E "Cushioned Power." Three shallow dishes of mercury are used—one fixed to the top, one to the side, and one to the supporting base of the motor. The responses of the sensitive mercury surfaces prove that "Cushioned Power" isolates vibrations.

This resilient mounting has excellent sound-isolating properties. The springy live-rubber has been treated to make it impervious to oil and thus assure permanent alignment. "Cushioned Power" is another reason why G-E motors will help you sell air-conditioning equipment. Write for Bulletin GEA-1276A.

HELPS YOU SELL AIR-CONDITIONING EQUIPMENT

GENERAL ELECTRIC

070-55

ASSOCIATION Activities

Springfield, Ohio

We have had an Association in our city since 1903, it being in effect before a National Association was formed.

We have been fairly active and if nothing more was accomplished, the good feeling between our members is worth much. We have been much interested in our Code and now that it is approved are laying plans to call a meeting of all master craftsmen to elect a local Code Authority Committee.

We are waiting to have clarified a question as to what constitutes a trade area and just how it is determined and by what authority.

Are we to consider our county in which our city is centrally located our trade area or do we reach over into other counties or are we limited to a certain radius outside our city? We must know this to ask the eligible ones to attend a meeting.

Our members are desirous of continuing our association and hope to get many more members. We will sponsor the calling of the meeting and pay the initial expense of notices just as soon as we are put right on the Trade Area question.

Chas. F. Hauck,
Secretary.

Oshkosh, Wis.

Our group has made no provision as yet for compliance under the code nor have we as yet set up a local code authorization committee. Our association has not joined with the state association or with the regional association to establish committees.

Business since the first of the year has been exceptionally good, although the month of April showed a marked decline. May, however, has started in such a way that it should prove a record month. No contracts of note have been let.

We are not conducting a drive for members but we have at the present time seven members in the association.

When the code is signed our local association will co-operate in every way possible in its enforcement. We have had no new election of officers.

M. G. Prehn,
Secretary.

Youngstown, Ohio

At the forty-second regular weekly meeting of the Sheet Metal Contractors' Association of Youngstown and Vicinity held since its organization in August, 1933, and attended by twenty-one of its thirty-one members and taking place in rooms of Plumbers' Home, 219 Lincoln Ave., Youngstown, O., on Friday night, May 25th last, under "Communications," the secretary read National Secretary W. C. Markle's May 21st letter, together with "Bulletin No. 1" and "Typical Local Trade Area Outline of Procedure."

It was decided that for present our trade area should include the County of Mahoning (of which Youngstown is the county-seat) and the neighboring towns of Girard and Hubbard of Trumbull County. It was regularly moved, seconded and carried "that our Association call a general meeting of ALL interested in the Roofing & Sheet Metal Contracting Industry for Friday night, June 1st to elect a Local Code Authority."

The call was accordingly sent out to 75 persons. The night of June 1st was very hot, but twenty-seven firms were represented; a temporary chairman, G. F. Ockerman and a temporary secretary, J. J. Dalzell, were selected. It was determined, upon discussion, that Local Code Authority should probably consist of five members. Members of the mass meeting offered the names of nine in nomination.

The result of the balloting was as follows:

George F. Ockerman, 62 West Myrtle Ave., who conducts a sheet metal shop and does slate and tin roofing and installs warm air furnaces.

Walter L. Leedy, with Roofing & Sheet Metal, Inc., 10 Hogue St., who do slate, tin, tile and composition roofing, general shop work, specializing in heating and ventilating.

Joseph R. Perkins, of The Perkins Hardware & Roofing Co., 1502 West Federal St., who for many years have conducted a general hardware store, tinshop and furnace installation as well as slate and tin roofing also in later years some composition roofing.

Herbert Owens, of The Youngstown Furnace Company, 630 Marshall St., for many years specializing in installing and selling warm air furnaces at wholesale and retail; in late years they also conduct a slate, tin, tile and composition roofing department.

James J. Dalzell, of The Dalzell-McClaskey Company, 940 West Rayen Ave., formerly The Dalzell Brothers Company, and conducting a slate, tin, tile and composition roofing business as well as a sheet metal contracting and a steel plate fabricating business.

Members of our Association have lent their support to the formation of our newly organized Construction League, A. M. Geary, manager, Edison Building, City. We are expecting much from the Construction League as it will perform the functions of a clearing house for the various trades. Forms, as shown, have been sent out in an effort to get every building trades contractor into the local league.

COMPLIANCE AGREEMENT
Youngstown, Ohio.

.....

Home Owners Loan Corporation.
Gentlemen:

It is hereby certified by the undersigned that he meets the requirements of, is complying with and will continue to comply with each approved Code of Fair Competition to which he may be subject in connection with any contracts for repair and/or alteration work—regardless of the size of the contract—which may be awarded to him by the H.O.L.C. as now established or as later modified or extended. It is further certified by the undersigned that he has been regularly engaged in business as a.....Contractor during the past .....years, carries workmen's compensation insurance and agrees to pay the prevailing Youngstown scale of wages for all labor used. The undersigned certifies also that he will cooperate to the end that no person who has defaulted on any H.O.L.C. contract be given any recognition by the trade until he has made good the default, and will award subcontracts only to those subcontractors whose qualifications have been approved by the compliance board.

Firm .....
Signed by.....
Address .....
.....
Youngstown, Ohio.
.....

The Compliance Board for the Construction Industry of the Youngstown District hereby certifies that it has examined into the qualifications of the above named applicant and finds that said applicant is to the best of this Board's knowledge and belief qualified by training, experience and responsibility to properly superintend, execute or cause to be executed any contract for.....work which the H.O.L.C. may see fit to award to said applicant.

The applicant's certificate for workman's compensation insurance has been inspected and appears as follows:
Insurance paid to.....
Certificate number.....

COMPLIANCE BOARD FOR THE CONSTRUCTION INDUSTRY OF THE YOUNGSTOWN DISTRICT.
Chairman.....
Secretary.....

J. J. Dalzell,
Secretary.

Ohio State Convention

Announcement is made that the Ohio Sheet Metal Contractors Association will hold their 1934 convention July 24, 25 and 26 at the Deshler-Wallick Hotel, Columbus, Ohio.

The program committee anticipates one of the best conventions ever held in the state as the general procedure under our newly signed Code will be the topic of discussion for much of the meeting. The committee intends that contractors shall obtain full information at the convention on code compliance and that recommended procedure for setting up local code administration will be given to all attending. The committee has the promise of the National Code Administrator in Washington to send a speaker qualified to answer all questions.

On the entertainment side, one evening will be spent in a downtown night club, with smoked glasses recommended.

Additional information will be ready shortly.

Convention Committee Chairman.
A. E. Bogen,

Chicago Associations Frolic At Open House

On Wednesday evening, May 16th, the International Heater Company and the Northwestern Stove Repair Company were hosts to about five hundred Warm Air Heating-Sheet Metal Contractors and dealers, members of Chicago associations, together with representatives of various manufacturing companies at the new South Side Branch of the latter company located at 8816 Commercial Avenue.

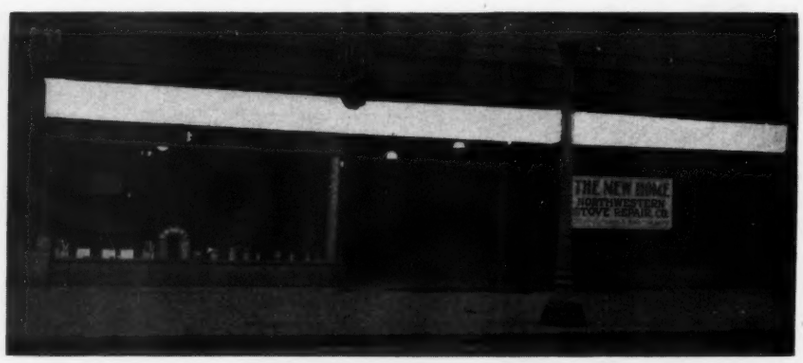
The meeting was held under the auspices of the Lake County Sheet Metal Contractors Association and the South End Employers Association with Charles Rood of Gary, Indiana, and J. A. Miedema of Chicago acting as co-chairmen. They introduced the representatives of the various associations including Lake County, Indiana; South Bend, Indiana; Kankakee, Illinois; Rockford, Illinois; Aurora, Illinois; Milwaukee, Wisconsin; Indianapolis, Indiana; St. Louis, Missouri; Detroit, Michigan, and Michigan City, Indiana; also the officers of the three associations of Metropolitan Chicago.

The meeting was then turned over to Master of Ceremonies Ray Lorenz of the Chicago Furnace Supply Company who introduced various speakers including introductory short talks by Judge J. Wm. Brooks of the Municipal Court, Alderman Wm. Rowan of the Tenth Ward and Alderman G. Lindell of the Ninth Ward.

D. C. Ellison, Vice President of Northwestern Stove Repair Company, gave a talk on the purposes of associations and the work to be accomplished by such organizations. In his address he said he wanted to leave one thought —that men in any industry make money when that industry makes money; that individual chiselling attains nothing profitable and, in conclusion, remember the definition of an association, namely, a group of men united for a common purpose.

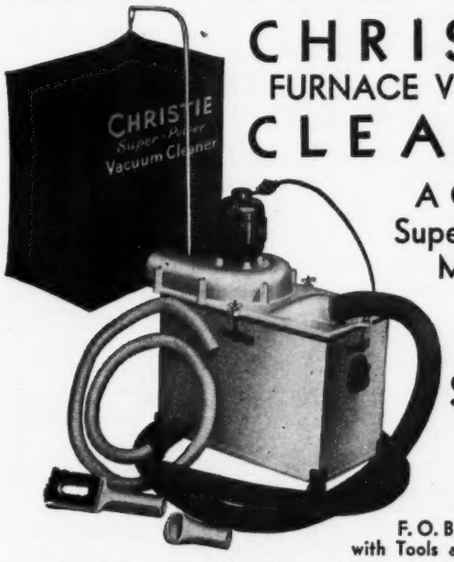
Cornelius I. Palmer, the association attorney, talked on organization work. Dr. Frank Keefe, Professor of Psychology at the Northern Illinois University, whose background has been in the plumbing and heating business since he was a boy, gave a most interesting talk on the psychology of advertising.

When the meeting was over delegates from the various associations met with W. C. Markle of the National Sheet Metal Contractors' Assn. to discuss various angles of the Code.



Upper left—T. Reid Mackin, who helped stage the meeting. Above—the new store of Northwestern Stove Repair Co. Lower—View of the several hundred association members.

Visitors and guests were shown through the new South Side Branch where Wm. L. Giermann supplied excellent entertainment and refreshments. Arrangements for meeting were jointly handled by the Northwestern Stove Repair Company and T. Reid Mackin, Western Manager of the International Heater Company.



CHRISTIE FURNACE VACUUM CLEANER

A One-Man Super Powered Machine

$99.50

Subject to Change Without Notice

F. O. B. Cincinnati with Tools and Attachments.

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationally low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

CHRISTIE CLEANER COMPANY

Division of The Cincinnati Sheet Metal & Roofing Co.

226-30 East Front St. Cincinnati, Ohio

Salesmen: A few choice territories still open.

WHITNEY LEVER PUNCHES

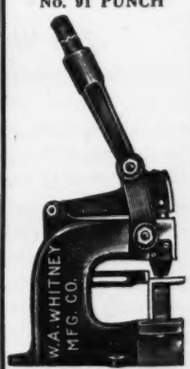
No. 4B PUNCH

Length—8½ inches. Capacity ¼-inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies—⅛" to ⅝" by 64ths.

No. 6 PUNCH

Length — 26½ inches. Capacity — ¼-inch hole through ⅝-inch iron; especially adapted for button punching or templet work. Punches and dies ⅛" to ⅝" by 32nds.

No. 91 PUNCH



Capacity — ⅝-inch hole through ¼-inch. 1-inch hole through ⅜-inch and 2-inch hole through ⅛-inch iron. Depth throat 5-inches. Weight — 82 lbs.

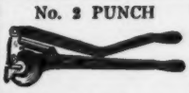
We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber

No. 1 PUNCH

Length — 34 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes from ⅛ to ⅝ by 64ths.

No. 2 PUNCH



Length — 23 inches. Capacity — ⅜-inch hole through ¼-inch iron. Punches and dies in sizes ⅜-inch to ⅝-inch by 64ths.

CHANNEL IRON PUNCH

Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity — ¼-inch hole through ¼-inch iron.

W. A. WHITNEY MFG. CO.

636 RACE ST. ROCKFORD, ILL

PUT IDLE "RACK-MONEY" *into Your Pocket!*

SHEETS on the rack never earned profits for any contractor. They must be worked, installed—SOLD!—if you are to make money. Armco has helped thousands of contractors keep busy—through strong national advertising that sends people to shops that use ARMCO sheets; through the helpful columns of INGOT IRON SHOP NEWS; through business-getting mail pieces, and many other valuable aids. And most important of all, through consistently uniform and durable Armco INGOT IRON. ARMCO Distributors supply you easy-working, customer-satisfying sheets and point-of-sale assistance as well. See your nearest distributor about this whole profitable plan—or, if you wish, write us direct.

THE AMERICAN ROLLING MILL COMPANY

Executive Offices: Middletown, Ohio

ARMCO

THE SHOP-SAVING IRON THAT SELLS EASIER

Association Activities . . . .

Memphis, Tenn.

We have a fairly good association, with the following list of members:

Bluff City Sheet Metal Works, A. W. Burdick & Co., Chlem & Sons, Jake Dermon, Dixie Sheet Metal Works, W. L. Eichberg, W. J. Erickson, J. N. Gray, Holland Furnace Co., Geo. B. Harper, O. H. Hendricks & Sons, Wm. C. Horner, M. A. Jurgens, E. C. Kelly & Co., Wm. McMullen, Harry Mrasek, Memphis Blow Pipe Co., J. J. Nolan & Co., Nohsey & Schwab, R. Sauter, W. E. Sanders, A. Sample, Tennessee Sheet Metal Works, A. Walters, J. B. Wohlford, J. P. Werner, Walker & Shelton.

We intend to call a meeting of our association Monday, June 11, 1934, and will notify in writing, every firm or firms who come under our code, inviting them to this meeting in order to try and get properly organized and to carry out our part of the code as near as possible.

The writer, W. L. Eichberg, received a letter from the Construction Code Authority, notifying me to meet with the local committee, to disseminate correct information about the code.

I was designated as a representative of my industry. This board will meet Tuesday, June 5, at which time officers will be elected and the duties of the members of this committee will be defined.

W. L. Eichberg,
Secretary.

▲ ▲

Canton, Ohio

Our Association has grown monthly since we organized. We extended an invitation to all sheet metal contractors in the county to join us, and as a result the leading contractors of North Canton, North Industry, Hartville, East Canton and Louisville came in. Massillion, O., brought in ten new members.

We have a club room at 1442 Tuscarawas St. W., which is on the Lincoln highway. We meet the second Monday of each month, at which time we serve a buffet lunch, and always have a big attendance and a good time.

Several of our members have signed contracts for home loan work which is now being let. Business in general is picking up according to reports of members.

Officers are: Charles Wills, President; Harry Fravel, Treasurer, and Ralph J. Peters, Secretary.

Ralph J. Peters,
Secretary.

Washington

On account of the geographical barrier of the Cascade Mountains which is also a barrier to trade, the state of Washington has been divided into two districts—the Western Division including all of the state west of the Cascade Mountains and north of Kelso and Long View, but including both of these cities and the balance of the state with the exception of Clark, Skamania and Klickitat Counties which are in the Portland trade area, in the Eastern District. Each district will elect a District Code Authority and the two District Code Authorities will elect the State Code Authority. This is, of course, if approval of the Divisional Code Authority is received on this division. The reason for such division is very plain to those of us living in this state and we hope that others will see it the same way that we do. For instance, the eastern part of the state (that is, east of the Cascade Mountains) depends on fruit and mining, and both the fruit and the mining have been rather hard hit. The western part of the state, depending on lumber and shipping, has not been hurt as much and the wage scale in the eastern part of the state will have to be less than in the western.

We are electing the Local Code Authority from the various branches of the industry instead of electing them at a general meeting so as to give all parts of the industry representation on the Local Code Committee which perhaps they would not receive if an election were held in any other way. The furnace contractors held a meeting June 1 and William Carsen of the Majestic Furnace Co. was elected Local Code Authority for the furnace contractors. The composition shingle contractors will meet June 4 to elect their representative.

The other parts of the industry will meet June 5 and 6 and we will then have all of our members for the local committee elected. On June 8 a general meeting of all of the sheet metal and roofing contractors will be held at which time the District Code Authority will be elected by the members of the industry in the western part of the state.

The eastern division of the state will probably have an election very shortly.

To All Members of the Sheet Metal and Roofing Industry in King County, Greetings:

In order to have a fair election of members to the Local Code Authority of the Sheet Metal and Roofing Industry in King County so that all branches of the Industry will be represented on this committee the Industry has been divided into five divisions as follows:

1. Composition-Shingle, Clay Tile and Slate Contractors.

2. Sheet Metal Contractors (not including shops doing furnace work but including all lines of sheet metal work excepting Kitchen Equipment and Ventilation).

3. Sheet Metal Contractors-Ventilation and Kitchen Equipment.

4. Builtup Roofing, Mastic Floors and Waterproofing.

5. Furnace Shops and Contractors for Furnace work.

Each of the above divisions will meet and elect one of their branch of the Industry as a member of the Local Code Authority. No member of the Industry will be permitted to either nominate or vote for a candidate unless he is engaged in the particular branch of the industry that the candidates if elected will represent, this is done in fairness to all for the reason that it is unfair for those that are not engaged in a particular division to attempt to say who shall represent such a division unless they are in such a division.

This method of election was suggested as being the fairest to all by Mr. W. V. Ketcham of the local NRA office and it seems the fair way.

It is the desire that only **one representative** of each firm attend on account of seating capacity being limited.

The Code Committee which will function until the Divisional Code Authority has been accepted by the Administrator of the NRA and appointed request that all Committees be limited to the least number possible that is the reason for five divisions.

The election of Local Code Authorities will be for a local district which may include one or more counties. The election of District Code Authorities will be as follows: the State will be divided into two districts—Western District and Eastern District.

The Administrative Committee for the Western District of the State will elect three members of the State Code Authority, and the Committeee for the Eastern District will elect two. This is according to the population and geographical conditions of the State.

The Local and District Code Authority will be elected by the members of the industry in the various districts and county or counties.

Robert W. Larsen,
Secretary.

▼ ▼

Fort Wayne, Ind.

We have held meetings in several of the counties since May 1, and have set up county organizations which have been working ever since with the best of results and we are hoping to get those not yet set up going in a short time. We are proceeding slowly until the National Authority is approved and at that time we will be ready to go at it in earnest.

We are to have a meeting June 7 with all county representatives present to give us some more detailed information as to their activities.

Here in Fort Wayne we are going along in fine shape. We have had several calls on enforcement but find most of them to be misunderstandings and easily ironed out.

We have our prices all set up and ready to submit to the proper authority as soon as we are able to learn who he is, so in all we are marking time until we can get information from some one higher up.

Chas. E. Tharp,
President.

The Education of a Moujik

By Ivan Nitchevo

Chapter IV

IT was only a question of time before Theodore found himself in the position of having a cinch on a respectable contract and he called a meeting of his competitors for the purpose of establishing his claim and securing their assistance. Their half hearted assurance that they would "go along," was the preliminary smoke screen to their customary effort to break up Theodore's chances. This was his first experience with the usual component of a complimentary bid, known as the "double cross."

In serene confidence that at last he could get a job with a decent margin for profit and overhead, he figured the work and prepared a schedule of prices ranging above his bid for his competitors. When he presented them at a meeting, a howl went up from the more rapacious.

Some of them insisted that his price was entirely too high. If they were to go along, the price would have to be reduced, or they wouldn't play. Their motive, born of pure orneryness, was to drive Theodore's price down so he would lose money.

Others were just as insistent that the price was too low and that it would have to be raised. They were afraid (so they said) that there might be some slip that would throw the work to them —their real reason was that they hoped to chisel in somehow.

After much bickering, due to the absence of any authority such as a survey bureau that would have established the real worth of the job, a compromise was effected, in which all parties agreed to bid the job, protecting Theodore. Confidently he mailed in his bid.

Three days later he called on the Architect, and was informed that the contract had been let to the Meyer Ventilating Company.

The Architect seemed reluctant to give any details, so Theodore streaked for the Association office, where he yodeled his wrath to the secretary. The secretary called a meeting of the grievance committee and Theodore presented his complaint. Meyer was hauled on the carpet and offered in his defense, that the Architect had offered him the job on a cost plus basis, and he had to accept.

What Meyer did not tell, however, was that the Architect had signed a note on a loan he had obtained from Meyer. two years before. Meyer had merely reminded the Architect that unless he obtained this job he would have to present the note for payment.

(To be continued)

60 tons of GOHI

PRONOUNCED "GO-HIGH"

American Medicinal Spirits Co., Louisville, Ky. L. C. Abbott, Architect & Engineer

protect a $2,500,000 stock

Under the gleaming exterior of aluminum paint, which covers this giant 50,000 bbl. warehouse of the American Medicinal Spirits Co., of Louisville, Ky., are 60 tons of GOHI—Genuine Open Hearth Iron.

20 gauge black GOHI was used for the exterior, covered with a base coat of red lead in oil and a finish coat of aluminum paint. Not only in daylight, but at night under the brilliant illumination of floodlights, the building presents an imposing appearance.

More important than appearance, however, is the protection given the contents by GOHI, the longest lasting, low cost ferrous metal obtainable. Gohi—pure iron-copper alloy, is the choice of all value wise buyers of sheet metal, whether the project is a complete warehouse as illustrated, a ventilator, or a small repair job.

THE NEWPORT ROLLING MILL CO.

Newport, Ky.

GENUINE OPEN HEARTH IRON GOHI PURE IRON - COPPER ALLOY

GOHI

PRONOUNCED "GO-HIGH"

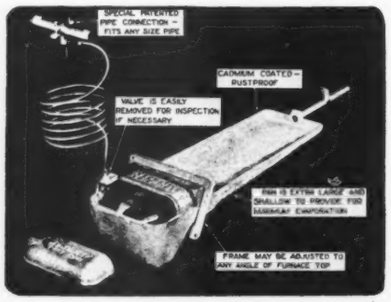
SHEET METAL

New PRODUCTS

Humidifier

The Henry Furnace & Foundry Co., Cleveland, Ohio, announce the new "Moncrief Automatic Humidifier" with ten points of superiority.

The humidifier is built of cast iron coated with Cadmium to give a durable, rust-proof and easily cleaned unit. The large pan evaporator is built to provide maximum water surface. The valves can be adjusted to provide the correct amount of water in the pan needed for every individual installation. Reservoir and water pan are built as one unit to eliminate chance of leaks and make the unit easier to install. Special fittings make the unit applicable to either rectangular or pitched round casing. An inside curtain forms a seal to prevent air from escaping around the opening.


SPECIAL RIVETED PIPE CONNECTION – FITS ANY SIZE PIPE
CADMIUM COATED – RUSTPROOF
VALVE IS EASILY REMOVED FOR INSPECTION IF NECESSARY
PAN IS EXTRA LARGE AND SHALLOW TO PROVIDE FOR MAXIMUM EVAPORATION
FRAME MAY BE ADJUSTED TO ANY ANGLE OF FURNACE TOP

Float valve can be serviced by removing the valve from the unit without disturbing the pan. The company states that tests show no chatter, splash or other sources of noise.

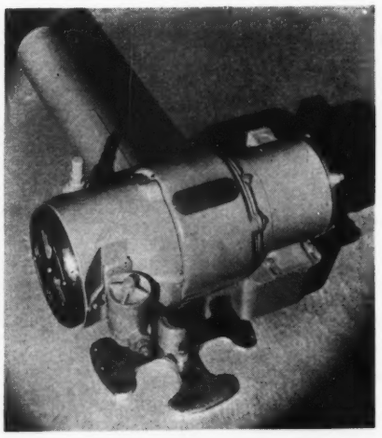
The unit is being furnished at a very attractive price and full details may be obtained from the company.

◆

New Oil Burner

A low-price, pressure-atomizing type, conversion burner has just been added by the Heater Division of Motor Wheel Corporation to its line of oil burning cooking ranges, bake ovens, water heaters, circulating heaters, boiler-burner units and other oil burning utilities.

Identified as THE MW EMANCIPATOR, the burner is furnished in one model flexible enough to meet all domestic heating plant requirements. Important advantages cited include: aluminum casings of modern design, smooth, quiet operation without roar



or vibration due to a built-in silencer, radio interference eliminator, no hot or moving parts exposed, ease of installation and high standards of efficiency and economy in operation, and the finest standard controls and accessories.

The burner is designed to operate on No. 3 oil with a burner capacity of from 1.35 gallons to 4 gallons per hour. It employs a 1/6 H.P. direct-drive Emerson Motor, new Webster Transformer, latest model Tuthill Pump, Detroit Lubricator Pressure Relief Valve and Strainer, Draft-a-justor draft regulator, Wilson interchangeable nozzles, and Mercoid or Minneapolis-Honeywell controls are optional. It is listed as Standard by the Underwriters' Laboratories.

In addition to furnishing The Emancipator as a conversion unit, MW has adopted this burner as standard equipment on its 800 series Boiler-Burner Units and also on the MW Weather Control Units (forced warm air heating and ventilating units).

Literature describing both the burner and the complete matched-unit equipment is available and may be obtained by writing the Heater Division of Motor Wheel Corporation, Lansing, Michigan.

◆

Shrink-Proof Crack Material

A new patching material, known as Stonhard Wallseal, is announced to permanently repair broken and spalled wall surfaces both inside and outside.

The material comes in powder form and is mixed with water to produce a stiff paste. This paste can be applied with either a trowel or putty knife and will dry in 20 minutes.

The material can be used to repair spalled or broken walls or to fill exterior cracks; for caulking around window and door frames; to fill cracks in concrete or composition floors; for sealing holes around pipes in floor or walls; as a plaster on walls; for making dustproof floor corners; for resetting and caulking vault lights; for pointing stone and brick, etc.

A trial drum of Stonhard Wallseal will be sent to any responsible company or institution so that they may remove enough material to make several test applications and observe the results for 30 days to convince themselves of the ease of application and advantages of this new material.

Write Stonhard Company, 401 N. Broad Street, Philadelphia, Pa.

◆

Peerless Blower

Peerless Electric Company, Warren, Ohio, announce a new two-wheel, direct-connected blower unit which is mounted on a base pan but is sold without a complete housing.

The blower wheels and motor are mounted directly on the metal base

through rubber insulators. The motor used is of the capacitor type with long oil pipes reaching to the back of the wheel scroll for convenience in oiling. An 8-speed selective controller is furnished and the unit may be so wired that several speeds can be obtained by changing the electric wiring to the controller board.

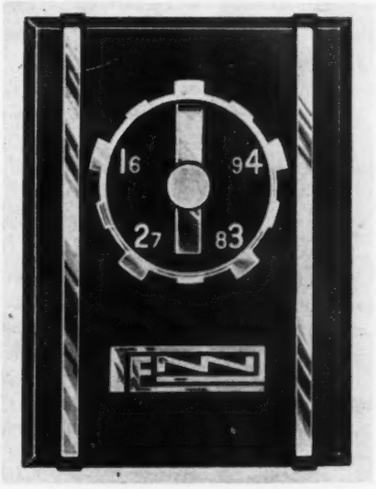
New Time Control

A new control system claimed to maintain practically unvarying room temperatures regardless of type of heating equipment is announced by the Penn Electric Switch Co., Des Moines, Iowa.

By means of this control system it is possible for the room thermostat to control the automatic heating equipment at some lower night temperature and to automatically restore, in the morning, the control of the heating equipment to the day-time setting.

This system, known as Type 720, is designed to be set into the wall using an attractive flush mounting wall plate. The instrument can be located close to the room thermostat, on the stairway or at any point which is convenient.

The operation of the system is as follows: Assume operation at the day temperature, controlling at 72 degrees, and that the Day-Nite Temtrol has been adjusted so that the night temperature is five degrees below the day temperature, or 67 degrees. Also, assume a retiring time of 11 P. M. As the householder passes by the Type 720 Timetrol, knowing that it is necessary for the heating plant to start operating on its day temperature at say 5 o'clock in the morning, he quickly calculates that from 11 to 5 is six hours, and turns the control handle of



the Type 720 in a counter-clockwise direction to the figure 6. The house temperature will slowly drop to 67 degrees when the burner will be started by the night contacts, and that temperature will be maintained until the Type 720 operates to complete the day contact circuit at 5 o'clock in the morning. The burner will then start bringing up the house temperature to the day setting of 72 degrees.

•

Felt Bonded Metal

Felt-bonded metal, offered jointly by H. H. Robertson Co., Pittsburgh, Pa., and The Felters Co., Boston, Mass., is produced by a method covered by patent which produces a permanent bond between felt and metal. In the process, says the maker's announcement, a metal coating is fused between the layer of felt and the metal so that the fibers of the felt are embedded in the metal coating and there is an actual complete bond which will not separate under heat, cold, moisture, fumes, or mechanical friction, strain, or distortion.

The application of felt may be to one or both sides of the metal. The thickness of the felt may be varied to suit requirements, as can also the weight of the sheet metal. After the felt is applied, the metal can be bent or shaped without breaking the felt contact.

The uses of this material are many; for example, it is now undergoing tests in several research laboratories for air conditioning equipment.

Dealers!
Investigate the Profits to be had in this Line.

U.S. STEEL FURNACES

50% More Heat With 25% Less Fuel

Sell lower fuel bills to your customers. The U. S. Steel Furnace does it—50% more heat with 25% less fuel. Performance like this makes profit for the dealer. The New Patented Reversible Return Flue steps up the delivery of heat and at the same time gives the dealer the edge in merchandising costs.

One model meets every fuel and chimney condition. Write today for complete data. Have a profitable season this year!

U. S. PRESSED STEEL PRODUCTS CO.
KALAMAZOO, MICHIGAN

Cleveland Job

(*Continued from page* 19)

type, with float valve automatically controlled. Dustop filters are incorporated in the system. A large filtering surface has been provided so that at no time is there an air velocity through the filters of more than 200 f. p. m. This area was selected to offer less resistance for the blower to overcome, and to insure higher efficiency and longer life for the filters.

A fine large recreation room, 16 by 24 feet, has been finished off in the basement. A warm air register is located in the ceiling and the return air register is placed in the baseboard. The distribution of air is perfect, and this room is as comfortably heated as any other room in the house. This recreation room should be highly enjoyable in summer as forced air circulation will prevent any tendency of the air to become musty and stuffy.

The house is well out in the open, subjected to plenty of exposure, so that the air conditioning system has a real job to do. The cold days of the early part of this past winter put it to a severe test, under which it performed most satisfactorily, and fuel costs are showing good economy of operation.

Code Procedure

(*Continued from page* 22)

5. Adopt Plan of Operation

(a) Budget—Committee shall prepare budget and plan of assessment as outlined in Bulletin No. 1 of Roofing and Sheet Metal Contracting Code Committee May 19th and submit to W. C. Markle, 429 Fourth Ave., Pittsburgh, Pa., for approval of Administrator.

(b) Collection of assessments for administration of Code—Such assessments are a trust fund and can be used for no other purpose. Must be equitable and fair to all members of industry regardless of membership in any trade association. Must include and remit promptly, assessments from each member of industry for Divisional Code Authority. Steps must be taken that bank acting as depository will not tie up funds if disbursing officer dies or becomes legally entangled.

(c) Office and Personnel—Committee should utilize local trade association facilities where available. Where no association exists, Chamber of Commerce, other agencies, accountants, field checkers and other individuals may be employed on a full or part time basis as required to administer the Code.

(d) Rules and Regulations—Committee should formulate By-Laws or rules and submit same to Divisional Code Authority for approval of Administrator. Must provide for filling of vacancies in committee membership caused by resignation and removal from office for any cause.

(e) Keep Minutes of All Meetings—Must be accurate as to all action taken.

(f) Complaints—Write NRA and obtain their Bulletin No. 7 and supplement Manual on Adjustment of Complaints. After approval of their election, Administrative Committees are permitted to handle complaints filed with them voluntarily by the complainant in accordance with code and subject to review of Divisional Code Authority and approval of the Administrator.

One Dealer *Starts* This Season With 2,000 Satisfied Customers

—his carry over from jobs well done last year.

THE two thousand will repeat this year, plus many more and, most valuable to him, nearly each one will buy *something* in the heating line.

More than 2,000 buildings this season guaranteed to him right now; 14 bills daily for 150 working days; that is his start for '34.

What do *you* start with? Can you match him?

His start came by cleaning heating plants in a Mid-West city. Your city may be larger or very small, but it will surely pay you good money.

He ran a small group of Super Cleaners, since increased.

Now cleaning more plants, 24 daily—144 per week—and he orders still more Supers.

Same kind of man as you are, no new deal government department, no welfare worker. Just an ordinary heating man who steps out of line to get along in the world. He knows he is making money.

Why don't you? You can do it, too, with one or more Supers.

Ask us how he does it—get his operating plan, nothing high brow, based on experience and hard boiled, successful. Also ask about a free trial of the Super to prove it for yourself.

Need not write, send your letterhead to

THE NATIONAL SUPER SERVICE COMPANY

1944 No. 13th St. Toledo, Ohio

WE KNEW!

When we told you last month that you were losing Furnace sales because you did not have enough furnace for the money.

We are proving this right along, and what a "big kick" we get out of it. Better join us and have some fun selling Peerless furnaces.

See them at the World's Fair General Exhibits Building.

The Peerless Foundry Co.

Indianapolis, Ind., U. S. A.

News Items . . . . . .

Sheet Metal Apprentices

At Mooseheart, Illinois, the Loyal Order of Moose (an international fraternity) maintains a school for the dependent children of deceased members, which provides both academic and vocational training for these students. For years this school has maintained a thoroughly equipped sheet metal department in which apprentices have been trained for the trade. Many of the past graduates of this department have gone to all parts of the country and have become a valuable asset to both the trade and their employer.

In June of this year, six boys will graduate from this department and, since most of them are orphans with no home to return to, they must seek employment at once. In additional to their vocational training, these boys are graduates of a fully accredited high school. They are all approximately eighteen years of age, well developed and clean, both mentally and physically. Their training has developed them to a point where they have a reasonable degree of skill in the use of materials, tools and machines common to the trade and a working knowledge of fundamental forms of construction and basic technical information including a thorough course in pattern drafting.

These boys must be self-supporting as soon as they leave Mooseheart and will accept employment in any shop offering steady employment and an opportunity to complete their trade.

To any sheet metal contractor or industrial executive that could use an apprentice of the foregoing qualifications, we will be glad to furnish any additional information requested.

◆

New Sales Office

American Sheet and Tin Plate Company, Pittsburgh, Pa., announce the opening of an additional office in the Chicago District, located in the Bankers Building, Milwaukee, Wis., with A. P. Bronson as resident manager.

◆

Code Authority for Fan Industry

A Code Authority Committee for the Fan & Blower Manufacturing Industry was approved May 3 by National Recovery Administrator Hugh S. Johnson. Members elected to serve one year are:

C. A. Booth, vice-president of the Buffalo Forge Co., Buffalo, N. Y.; J. M. Frank, president, Illinois Electric Ventilating Co., 2850 North Crawford Ave., Chicago; F. Herlan, vice-president, B. F. Sturtevant Co., Western Division, Inc., 404 Wrigley building, Chicago, Ill.; C. T. Morse, president, American Blower Corp., 6000 Russell St., Detroit, Mich., and R. H. Ware, vice-president and general manager, Clarage Fan Co., Kalamazoo, Mich.

◆

Distributor Appointments

Republic Steel Corporation, Youngstown, Ohio, announces the appointment of Railey & Milam, Inc., 27 West Flagler Street, Miami, Florida; the Ohio Valley Hardware & Roofing Co., Evansville, Indiana and Pidgeon-Thomas Iron Co., Memphis, Tenn., as distributors of Enduro stainless steel and Toncan iron.

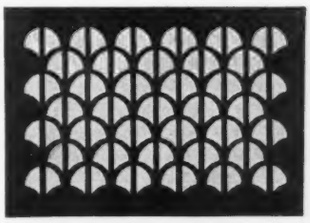
The company also announces that R. S. Archer has joined the staff as chief metallurgist of the Chicago District.

PERFORATED METALS

ARCHITECTURAL GRILLES

In Bronze, Steel, Stainless Steel, Monel, Aluminum, and other metals. Grilles of distinction for fine buildings in a wide variety of attractive designs. All of the standard and many original and modern designs are available in any metal, and of all dimensions, carefully made from selected stock. Grilles are but one of our specialties. We make Perforated Sheets of every type.

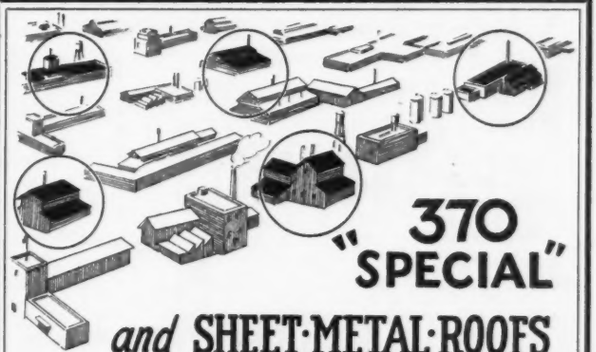
Pleasing Prices, Prompt Service



50 Years Experience Perforating Metals

The Harrington & King PERFORATING CO.

5649 Fillmore St., Chicago, U. S. A. New York Office, 114 Liberty St.



"370 SPECIAL" and SHEET-METAL-ROOFS

LOOK down upon the roofs in your community. Single out those roofs that are sheet metal and then make it your business to do the painting job.

And keep this in mind—*sheet metal roofs must be painted regularly in order that they continue to protect the buildings they cover.* Sheet metal roof painting is business that is constant and profitable.

With the fact that roofs must be painted regularly already established, the question that is important to you is, which paint to use, to do the job most satisfactorily and economically.

We suggest 370 "SPECIAL RED." Here is a paint, the ingredients of which, assure long life and protection and which is being recognized among buyers as an exclusive standard where quality is essential but where economy is stressed.

Other Thompson Products—Alumbrite—the new Aluminum Paint for Wood and Steel and Lin-O-Jap, the Perfect Reducing Oil for All Paint.

THOMPSON & COMPANY

P. O. Box 557, N. S. PITTSBURGH, PA.

Today, Business Is Made with
BRIGHT, TARNISH-RESISTING METAL
Use APOLLO *Sheets for lasting Satisfaction*

APOLLO
ChromCopper
For
Table Tops
Drain Boards
Shelf Covering
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Bars and Novelty Boxes

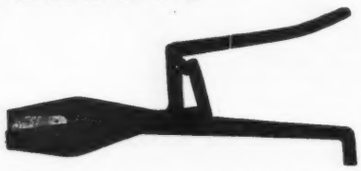
APOLLO
ChromTin
For
Stove Pipe
Collars
Elbows

APOLLO
ChromZinc
For
Range Hoods
Reflectors
Decorative Effects

APOLLO Sheets are standardized for immediate shipment from jobbers' warehouses. Write us for reference to jobber in your territory who guarantees to supply APOLLO Metals.

APOLLO COMPANY
BOX AA LA SALLE, ILL.
See page 18, Annual Directory Number, for full particulars regarding all APOLLO-Pre-Finished Metals.

SHEET
METAL
IMPROVEMENTS



Lots of improvement jobs developing—many for the sheet metal specialist. The season is *on!*

Viking Shears help you quote job-getting prices; help you show a profit on jobs you land.

Fast work — clean work — and easy to use, Viking Shears justify their reputation.

Let us give you the details.

VIKING SHEAR CO.
ERIE - - - - - - PA.

VIKING

News Items . . . . . .

Dail Steel Products Appointments

The Dail Steel Products Company, Lansing, Mich., have just appointed National Thermal Co., 185 Main Street, White Plains, New York, as their sales representative covering the counties of Westchester, Dutchess and Putnam in the State of New York and Fairfield County in the State of Connecticut.

This organization will handle the sales of Dailaire equipment in these counties and will offer a complete engineering service.

The company also announces the appointment of A. J. Thayer of Thayer Engineering and Equipment Co., 163 Summer Street, Auburn, Maine, covering the state of Maine and the counties of Strafford, Belknap, Carrol and Coos in New Hampshire.

Mr. Thayer will contact dealers and cooperate with them in their engineering problems.

◆

Annin Joins Minneapolis-Honeywell

Douglas Annin, who has been actively identified with the distribution of industrial process controls for the last 10 years, has joined the staff of Minneapolis-Honeywell Regulator Company, according to an announcement by C. B. Sweatt, Vice President in Charge of Sales.

Mr. Annin, who has developed a number of control patents pertaining to valves and automatic regulators, joins, in a sales and engineering capacity, the Industrial Regulator division of Minneapolis-Honeywell.

Prior to joining Minneapolis-Honeywell, Mr. Annin was chief engineer of Neilan Company, Ltd., Los Angeles, and when this firm was merged with the Mason Regulator Company, Mr. Annin became Sales Engineer of the Mason-Neilan Regulator Company of Boston. He is a graduate of the California Institute of Technology.

◆

Death of Dirk Meyer

The industry will hear with regret of the death of Dirk Meyer, which occurred on May 4th. Until his retirement from active business two years ago, Mr. Meyer was president of the Meyer Furnace Company and Victor Foundry Corporation, and vice president of F. Meyer & Bro. Company, the latter being the original Meyer company organized in 1866. Mr. Meyer attained the age of 86.

◆

Edwards Promotes Senft

The Edwards Manufacturing Company, Cincinnati, Ohio, announce the promotion of W. G. Senft, Engineer, to Manager of the Heating and Air Conditioning Division. Mr. Senft has been associated with the design, production and sale of Hot-Kold winter air conditioning units since 1929.

◆

J. Asa Palmer Dies

J. Asa Palmer, president and general manager of the Burt Manufacturing Company, Akron, Ohio, died at his home May 1.

Mr. Palmer was sixty-six years old and had been a resident of Akron during his entire life. Mr. Palmer became identified with the Burt Manufacturing Company in 1903; was elected secretary in 1904 and became president in 1921.

New Literature . . . .

Attic Ventilation Leaflet

Bulletin No. 2940 covering the use of fans and blowers for cooling by means of attic ventilation is announced by Buffalo Forge Company, Buffalo, New York.

The leaflet describes in understandable language the reasons why attic ventilation can relieve uncomfortable interior conditions. The underlying principles of cooling by attic ventilation are presented in language which the consumer can readily understand.

The company has selected several of its blowers and propeller type fans especially suited for attic ventilation and published complete specifications of sizes, capacities, velocities, working static pressure, etc., in the last part of the leaflet.

Contractors interested in attic ventilation as a means of summer business can obtain a copy of this leaflet by addressing the Buffalo Forge Company.

◆

Paint Leaflet

A 1-page leaflet describing the various industrial and technical paints manufactured by Thompson & Company, P. O. Box 557, N. S., Pittsburgh, Pa., is announced by the Thompson Company.

The leaflet explains fully the composition of the non-corrosive paints, white paints, aluminum paints and aluminum vehicles.

Contractors wishing to know the composition of these various paint materials may find full information in the leaflet.

◆

Air Conditioning

A new leaflet entitled "Air Conditioning" has been published by International Heater Company, Utica, New York. The leaflet shows the company's line of Economy and Carton, cast and steel furnaces especially designed for forced air application.

Illustrations and explanations show the various furnaces in round and square casings with blower and filter equipment attached. Full explanation of the design of the items is given.

A special section in the leaflet describes the filters, humidifiers, blower, controls and other accessories used with this air conditioning line. A full page is devoted to tabulations of capacities, dimensions and specifications.

Copies may be obtained from the company.

◆

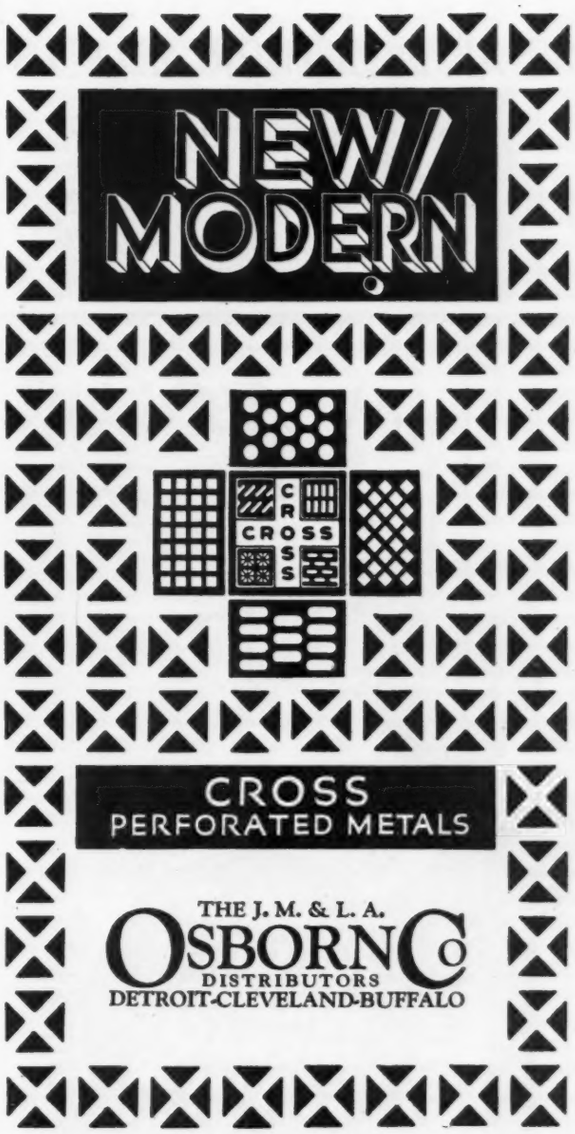
Air Conditioning Leaflet

An interesting 3-colored leaflet describing the proper application of an Electrol-American air conditioning unit has been put out by Electrol Incorporated, Clifton, New Jersey.

The leaflet is designed for consumer reading and covers such general phases of air conditioning as—what is the comfort zone, what are comfortable conditions in winter and summer, what are the economies of air conditioning, etc.

The leaflet also covers the general construction and application of the Electrol-American unit and gives full information on the general design of a typical system for both heating and cooling. Full specifications of the various units manufactured by the company are also given.

Contractors wishing copies of the leaflet for their files should address the company.



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BRUNETT PATENTED HEAT UTILIZER
The latest improvement in fuel saving—
Will Increase Your
. . . SALES
. . . PROFIT
and Will Save Your Customers 25 to 50%
of Their Fuel Costs
WRITE TODAY FOR DETAILED INFORMATION
BROWN SHEET IRON & STEEL COMPANY
Pioneer Welders of the Northwest
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FREE SAMPLE
RUBYFLUID PRODUCTS

☐ ACID CORE SOLDER ☐
☐ ROSIN CORE SOLDER ☐
☐ LIQUID FLUX ☐
☐ SOLDERING PASTE ☐

MAKE REQUEST ON YOUR LETTERHEAD

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COLUMBUS - 74 McDowell St. - OHIO

Install ÆOLUS *Improved* VENTILATORS

FOR industrial buildings, schools, homes, theaters, etc. Made in 14 different metals. Constant ventilation—no noise—no upkeep.

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Industrial Division of Paul Dickinson, Inc.
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Chicago, Ill.

ALL ON ONE ORDER TO BRAUER
Any REPAIRS FOR STOVES BOILERS and FURNACES
A.G. BRAUER SUPPLY CO. SAINT LOUIS
ALL IN ONE SHIPMENT TO YOU

FOR THE
Satisfactory
FURNACE INSTALLATION

The most satisfactory furnace installations result from the use of Walsh Asbestos Furnace Cement. No longer is it necessary to risk your reputation on furnace cements of questionable merit . . . just use Walsh on every installation and repair job.

●Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250 and 500 lb. steel drums.
●We also manufacture Furnace Tile and Fire Brick.

WALSH REFRACTORIES CORP.
Producers of High Grade Refractories for 50 Years
4430 North First Street St. Louis, Mo.

New Literature . . . .

Register Catalog

A new catalog No. 11, covering a line of "No Streak" wall registers and other products will be mailed to contractors by the Rock Island Register Co., Rock Island, Ill.

Full descriptions of the company's line of "No Streak," single and double, first and second floor, baseboard registers; cold air faces; Out-O-Wall registers; Island City registers; Vol-Yum registers; convex sidewall registers, are given on the first pages of the catalog. Each register type is accompanied with a complete tabulation of catalog number, size, type, boot size, finish and price.

The company's line of forced air, one-piece sidewall, baseboard and return air faces with dimensions, recommended capacities arranged according to typical velocities is also shown.

The catalog covers the company's line of accessories such as pulleys, chains, cords, public building grilles, wood faces, pipe fittings; with complete listings of prices, sizes and efficiencies.

A supplementary section covers jobbed items such as blowers, fans, humidifiers, furnace supplies and hand tools.

◆

Fire Pot and Torch Booklet

The Clayton & Lambert Manufacturing Co., Detroit, Mich., will mail to contractors a new booklet showing and describing the company's line of fire pots, torches and accessories. Each unit of the company's line is shown in an illustration accompanied by descriptive information on sizes, capacities, and prices. Full construction details of each unit are included.

The section devoted to accessories and parts shows each item in a drawing and gives the catalog number, the name of the part and the list price.

◆

Technical Data Chart

Technical Products Company, Pittsburgh, Pa., have made up for dealers a technical data chart No. 209 to assist in selecting the proper Sauer-Eisen product for any particular type of work.

The data chart is arranged according to name, followed by tabular matter which explains how the product is supplied; the weight per gallon; the resistance to water, acids, alkalis, oils and heat; the electrical properties; hardening characteristics; proper application; adhesion, etc.

Additional information on prices, size of containers and explanation of several of the products is also given in the leaflet.

Contractors using caulking compounds, furnace cements, metal cements, paste, and other adhesives, cements or compounds, may obtain copies of the leaflet by addressing the company.

◆

Air Conditioning Correspondence Course

International Correspondence Schools, Scranton, Pa., announce a new course in air conditioning. Full information on the course has been placed in the form of a booklet dealing with the general subject of air conditioning. The booklet describes the field, the general development of air conditioning, future possibilities of this work and gives a detailed discussion of the various subjects taught in the course.

Contractors interested in courses of this kind may obtain a copy of the catalog by writing the school.

New Literature . . . .

Perfection Stove Literature

Perfection Stove Company, Cleveland, Ohio, have recently issued two new booklets—the first a complete sales plan and the second a straight-line heating calculator.

The sales plan booklet is a manual of instruction and ideas. The booklet discusses such things as preparing demonstrations, learning principal selling points, how to find prospects, using outside salesmen, discusses all types of advertising, direct mail, billboards, newspapers, etc. Various literature which the company publishes for prospect consumption is explained and the dealers' newspaper advertising is covered with full instructions.

Chapter II of the sales manual covers modern sales methods; outlines a suggested sales talk; presents a suggested demonstration.

The straight-line heating calculator, the second book, consists of the necessary instructions by monograms with divisional lines on which a rule or straight-edge is laid and the calculation read from one line to the other.

Monograms and necessary explanations are given for the following factors—excessive heat loss through doors and windows; heat loss through walls, floor and ceiling; correction for exposure and windage; correction for temperature differences greater than 70-degrees; chart for determining pipe sizes and free area of registers and grilles; chart for sizing rectangular ducts; chart for area and size of gravity leader pipe. Several typical examples are worked out step by step and a typical data sheet is filled in.

Contractors interested in a valuable engineering compilation of this type should write Perfection Stove Company for full details on how to secure copies.

◆

Ventilating Fan Catalog

B. F. Perkins & Son, Inc., Holyoke, Mass., will mail to contractors their bulletin No. 10 covering the company's line of ventilating fans.

The catalog gives full descriptive information of the design and construction of the units with tables of capacities and information on proper selection and application of the units.

The company's line of fans range from belt-driven propeller to direct-connected fans of the wall, hung and platform mounted types. Tables and charts give the sizes and full dimensions with ratings, speeds and prices.

◆

Filter Leaflets

Staynew Filter Corporation, Rochester, New York, will mail to contractors three leaflets describing the use of filters in various types of cleaning applications.

One leaflet describes the company's "Protectovent" ventilators a unit designed for application at windows. The unit consists of a metal frame containing a propeller type fan and a filter section. The fan draws air from outside through the filter and introduces it into the room. This operation removes all street dusts and also serves to lessen street noises.

A second leaflet describes the possibilities of alleviation of hay fever and respiratory diseases by the use of the "Protectovent" unit.

The company's "Multi-V-type" filtering units suitable for application in large installations is covered in the third leaflet. The text and suitable illustrations describe the general construction of the filter cells, capacities against various pressures, sizes of filters, and uses of this filter in large panels for ventilating work.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

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JOSEPH T. RYERSON & SON Inc.

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SHEETS

"Talk About Profitable Repair Orders and Cleaning Profits with the TORNADO Furnace and Boiler Cleaner

"My TORNADO Furnace & Boiler Cleaner has brought me more profitable repair and replacement business than I have had in years in addition to hundreds of dollars profit on the cleaning. In our 35 years in business it is the most profitable investment we have ever made." So says the General Repair and Equipment Co., Elizabeth, N. J.

Hundreds of other TORNADO users are also cashing in on the splendid profits to be made with the TORNADO. You too can earn real money with the TORNADO. Send in at once for complete details and also for the facts proving Breuer's TORNADO to be a superior cleaner with the most complete tools (chimney cleaner if desired)—No obligation—Write us TODAY for free trial offer.

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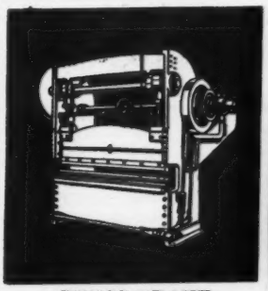
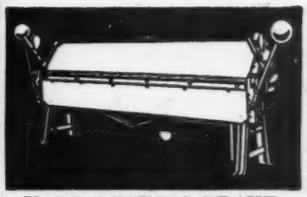
865 Blackhawk Street, Chicago, Ill.

FOR REGISTERS AND GRILLES FOR ALL PURPOSES

THE AUER REGISTER COMPANY
3608 Payne Ave., Cleveland, O.

CHICAGO





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Steel Brakes—Presses—Shears

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"VIEWS of the 1934 WORLD'S FAIR"

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MICHIGAN at CONGRESS CHICAGO

IN PHILADELPHIA
In the Heart of Things

Here one may live graciously, yet inexpensively . . . where modern luxuries combine with friendly hospitality to assure an enjoyable visit.

You may properly expect precise, thoughtful service . . . and a cuisine that is one of the enduring traditions of this world-famous hotel.

Claude H. Bennett
General Manager

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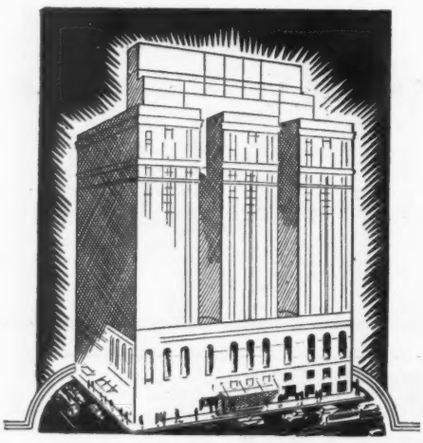
RENDEZVOUS
of PITTSBURGH'S SMART SET



Two famous restaurants, a tap room, a cafeteria, a roof garden decorated by the late Joseph Urban, the Continental Bar, the Halter and Hurdle Room, and famous dance orchestras provide a variety of opportunities for food, drink and entertainment at a wide range of prices. Rooms are cozy and elegantly furnished, rates reasonable. Centrally located, a few steps from anywhere.

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1600 ROOMS • 1600 BATHS

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All come back to the Lenox. Famous for good food, homelike comforts, perfect service.

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Double, $2.50 to $5.00
Family Suites, $6.00 up

Send for Free AAA Map and Booklet

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Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?
—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

AMERICAN ARTISAN
6 North Michigan Ave. Chicago, Ill.

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. One inch $3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date.

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MACHINES-TOOLS-SUPPLIES for

SHEET METALS

Have you seen the new

CHICAGO STEEL FOLDER BRAKE?

Lengths, 36"—42" **Capacity 20 Ga.**

Will bend heavier metal than a folder. Will bend channel bends smaller than a brake.

Investigate this machine!

Prices and details sent on request.

WARD MACHINERY CO.
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SITUATIONS OPEN

WANTED — EXPERIENCED METAL Worker and Plumber. Also some knowledge of electrical work, oil burners, etc. Give complete experience, references, wages, hours, etc., in first letter. Please do not answer this ad unless you mean business and can do the work. The Werner Co., Tracy, Minn.

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ARE YOU LOOKING FOR A RELIABLE, sober, conscientious A-1 sheet metal worker and tinner—one who drafts patterns correctly; executes his work neatly and in reasonable time; one who knows shop and outside work and has sales ability? I should like to locate permanently with some reliable and well established hardware firm with metal shop in connection. Can prove my ability to your entire satisfaction. Will go anywhere. Address Sheet Metal Worker, 424 West High Street, Defiance, Ohio

FOR SALE

FOR SALE—ONE No. 518-A PEXTO Grooving Machine with Rolls. Original cost $75.00. Will sell for $45.00 cash. Machine has scarcely been used. Address The MacINTYRE Co., Inc., Fond du Lac, Wisconsin.

OPPORTUNITY ONCE—NO MORE—AN established Sheet Metal Shop—doing a nation-wide business—owner has made his and wishes to retire from active business. This shop is fully equipped with tools and machines, all in first class condition in a brick one-story building 50x100 ft. No indebtedness of any kind—good credit and in active operation right now. A chance of a life time for two or three expert sheet metal workers with 3 or 4 thousand dollars to invest. With easy terms on the balance. General line of work consists of Skylights, Blow Pipe, Cotton Gin Pipe and Elbows, Smoke Stacks, Ventilating, Radiator repair work—Light welding and Brazing, Tin and Slate Roofing. Men that are able and interested. Address Key 279, "American Artisan," 6 North Michigan Ave., Chicago, Illinois.

FOR SALE

SHEET METAL WORKING MACHINERY AND TOOLS

●

Rebuilt - Trade - In Machinery

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Angle Iron Cutters	**Grinders**
Beading Machines	**Punches**
Bending Brakes	**Shears**
Bar Folders	**Turners**
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MANUFACTURE YOUR OWN TINNING Compound that tins all metals—also Combination Welding and Brazing Flux. Save Money—Buy Fisher's Guaranteed Formulas—$5.00 each. Tinning Compound—$1.75 lb. Combination Welding and Brazing Flux—$1.25 lb. F & W Manufacturing Company, 1411 Davenport Street, Omaha, Neb.

MAKE SOME MONEY AND HAVE SOME fun doing it. Put on a minstrel show, play, operetta. Trade and social groups are following the idea successfully with our material—plays, operettas, musical comedies, minstrels, comedy and revue songs, blackface skits, vaudeville acts, monologs, dialogs, recitations, juvenile plays and songs, musical readings and other entertainments; make-up goods. Catalog free. T. S. Denison & Co., 623 So. Wabash. Dept. 26, Chicago.

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BLAST GATES

Write for Price List. Standard Sizes Carried in Stock for Immediate Shipment.

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WANTED TO BUY

WANT TO BUY A SET OF TINNER'S tools including brake and square shears, 30 inch folder. State in your first letter what you have and your price. Address Keith Furnace Company, 2601 Dean Avenue, Des Moines, Iowa.

BRAKE WANTED—ANY SIZE, MUST BE bargain for cash. Middleton Electric Company, 514 Ohio Street, Sedalia, Mo.

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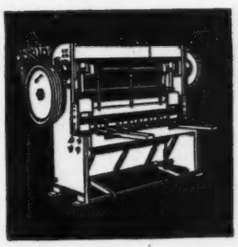
COMING TO THE WORLD'S FAIR? THEN SEE US FOR

SHEET METAL MACHINERY

PRICED TO SELL — READY TO SHIP

FREE AUTO PARKING PRIVILEGES



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Power Bending Brakes, Chgo. St. 6'⅛"; 8'⅛"; 10'10; 10'⅛".
Press Brakes, 10'10; 10'⅛"; 10'⅜".
Bar Folders, 20", 30", 36", 42".
Brakes, Chgo. St. 8'18; 8'16; 8'14; 10'16; 10'18; 6'18; 6'16; 4'16.
Brakes, Chgo. St. Box & Pan 4 & 6 Ft. 6" and 8" finger extensions.
Shears, Power 30"14; 36"18; 42"14; 8'14; 8'16; 8'⅛"; 5'⅛"; 10'⅛".
Shears, Foot 30"; 36", 42", 52", 96".
Angle Iron Roller 2x2x¼".
30"x2" Pexto Plain Roll.....$15.00
36" throat Nia. Hand Punch..$85.00
Comb. Punch & Shear 6x6x½".
No. 2 Whitney Hand Punch..$8.50
Spot Welders 7½, 15, 25 & 35 KW.
Pexto Shear & Punch.....$15.00
1KVA 110 volt Spot Welder $20.00
3 & 6 Ft. Power Groovers.
14 gauge Unishear 110 volt.

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Send for Bulletin No. 835 listing modern requirements. Also List No. DLS-B covering David Lupton Machinery.

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ROLLS — SHEARS — BRAKES — SPOT WELDERS
PUNCH PRESSES — PRESS BRAKES — FOLDERS
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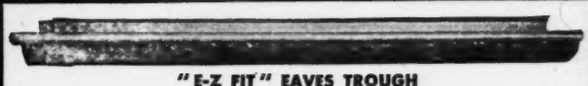
INTERSTATE MACHINERY COMPANY
130 E. Clinton St. - - - - - Chicago



"E-Z FIT" EAVES TROUGH

Bead is cut back, making it easy to put gutter together. Requires no soldering—not affected by expansion or contraction.

Write for Catalogue. Order from your Jobber.

"BB" The mark of quality

Eaves Trough . Gutter Hangers . Conductor Pipe
Conductor Fasteners . Mitres . End Pieces and Caps
Conductor Heads . Ornamental Straps . Ventilators, etc.

BERGER BROTHERS CO.
229-237 Arch Street, Philadelphia, Pa.

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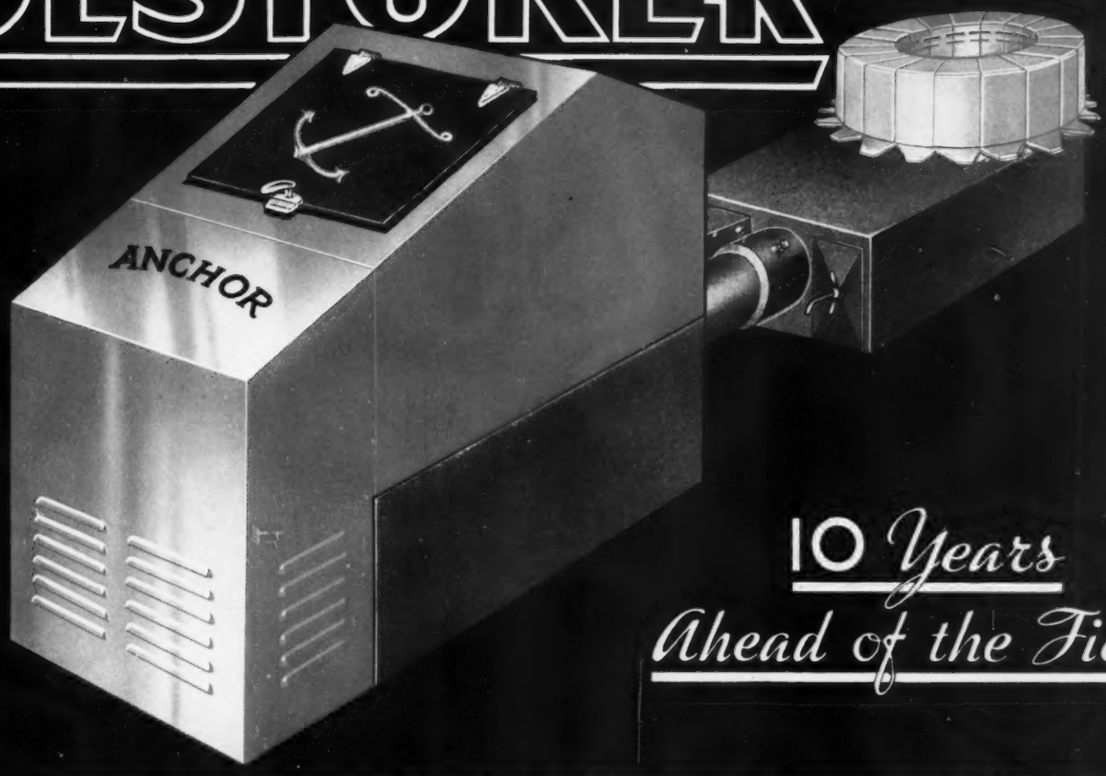

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